According to the new NCISM curriculum for BAMS Second Professional

As per the competency-based Ayurveda Medical Education Curriculum

Textbook of

RASASHASTRA AND BHAISHAJYA KALPANA

AYURVEDIYA AUSHADHI NIRMANA VIGYANA

Salient Features:–

- **Alignment with NCISM Syllabus** : Follows the updated NCISM curriculum with clear and detailed explanations of all Ayurveda formulation concepts.
- **Student-Friendly Layout** : Designed with an intuitive and holistic structure for enhanced conceptual understanding.
- **Exam Preparation Tools** : Includes practice short and long questions, multiple choice questions (MCQs) to build confidence and aid in exam readiness.
- **Formulation Guidance** : Step-by-step procedures for both traditional and modern Ayurveda formulations, including standardization techniques.
- **Research & Clinical Insights** : Features the latest research updates, advancements, and real-world case studies for practical application.
- **Classical & Modern References** : Cites classical Ayurveda texts alongside modern scientific articles to bridge traditional wisdom with contemporary science.
- **Focus on Therapeutic Efficacy & Safety** : Highlights the clinical effectiveness and safety profiles of various formulations.
- **Expert Contributions** : Enriched with insights from renowned Ayurveda scholars & experienced practitioners.

DR. JYOTI SHARMA

PART–1

FIRST EDITION

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List of Abbreviation

A. Plants Part

1. A.R.	–	Arial Roots
2. Bl.	–	Bulb
3. Dravya. G.Vi	–	Dravyaguna Vigyan Yadavji
4. Dr. Fr.	–	Dried Fruit
5. Dr. Sd.	–	Dried Fruit
6. Enm.	–	Endosperm
7. Exd.	–	Exudate
8. Fl.	–	Flower
9. Fr.	–	Fruit
10. Gl.	–	Gall
11. Ht. Wd.	–	Heart Wood
12. Lf.	–	Leaf
13. L.	–	Latex
14. Ol.	–	Oil
15. P.	–	Pericarp
16. Pl.	–	Plant (Whole)
17. Rz.	–	Rhizome
18. Rt.	–	Root
19. Rt. Bk.	–	Root Bark
20. Rt. Tr.	–	Root Tuber
21. Sd.	–	Seed
22. Stmn.	–	Stamens
23. St.	–	Stem
24. St. Bk.	–	Stem Bark

B. Books

1. A.A.G.S.	–	Ayurvediya Aushadhi Guna Dharma Shastra
2. A.F.I	–	The Ayurvedic Formulary of India
3. A.H.S	–	Ashtanga Hridaya Samhita
4. Amar	–	Amara Kosha
5. An. Kan.	–	Anand Kand
6. A. San. S.	–	Ashtanga Sangrah Sutra
7. Ak. Pra.	–	Arka Prakash
8. A.P.I	–	The Ayurvedic Pharmacopoeia of India
9. Ay. Pr.	–	Ayurveda Prakasha
10. Ay. Sa.S	–	Ayurveda Sara Sangraha
11. B.R.	–	Bhaishajya Ratnavali (Prof. Siddhinandan Mishra Edition) Bhaishajya Ratnavali (Pt. Shri Lalchandraji Vaidya Edition)
12. Br. R.R. Sun.	–	Brihatrasaraja Sundara
13. Bha. Bha. R.	–	Bharata Bhaishajya Ratnakara
14. Bha. Pra.	–	Bhava Prakasha
15. Cha. D.	–	Chakra Datta
16. Cha.Sa.Chi.	–	Charaka Samhita Chikitsa Sathana
17. Dhanv. Sa	–	Dhanvantri Samhita
18. Dravyaguna	–	Dravyaguna Vigyan Part 1 (Yadav Ji Trikam Ji)
19.Ka.Sa	–	Kashyap Samhita
20. Kai.Dev. Nig.Krit.	–	Kaiyadeva Nighantu Krita-mavarga
21. Ni. R. (Ma)	–	Shri Nighanturatnakara (Marathi)
22. Ra. Cha.	–	Rasachandashu
23. Rasen. Chu.	–	Rasendra Chudamani
24. R.P.	–	Rasa Paddhati
25. Rasen. Chi	–	Rasendra Chintamani

26. R. Kam. Dhenu	–	Rasa Kamdhanu Upakaran Pada
27. Rasen. Par.	–	Rasendra Parpatak
28. R. Man.	–	Rasa Manjari
29. R. Hr. T	–	Rasahridaya Tantra
30. R.Mr.	–	Rasamritam
31. Rasarnv.T.	–	Rasarnava Tantra
32. R.J. Ni	–	Rasa Jala Niti
33. Rasen.Sam.	–	Rasendra Sambhava
34. R.Paddhati,	–	Rasapaddhati Maharasa Prakarma
35. Maha. Pra.		
36. R.Sha.	–	Rasashastra
37. Parad Vig.	–	Parad Vigyan
38. R.R.	–	Rasaratnakara
39. R.R.S.	–	Rasa Ratna Sammuchya
40. R.Sa.San	–	Rasendra Sara Sangraha
41. Ra. Sha.	–	Rasashastra C.B. Jha
42. R. Ta. Sa.	–	Rasa Tantra Sara
43. R.T.	–	Rasatarangini
44. R.Yo. Sa.	–	Rasayogaratnakara
45. Sa. Yo.	–	Sahasrayosa
46. Sha. S.	–	Sharngadhara Samihita
47. Si. Yo. Sa	–	Siddhayoga Sangraha
48. Si.Bhai. Ma.Ma.	–	Siddha Bhaishajya Manimala
49. Su. Sa.	–	Sushruta Samhita
50. Vai. P. Pra.	–	Vaidyaka Paribhasha Pradipa
51. Su. Su.	–	Sushruta Sutra
52. Y.R.	–	Yoga Ratnakara
53. Yo.Ra.Jva. Chi.Au	–	Yoga Rajvara Chikitsa Aushadhi

C. Common Term

Q.S.	–	Quantity Sufficient.

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1 Chronological Development of Ayurvediya Aushadhi Nirmana

• Lecture: 2 hours, non-lecture: 1 hour • • Total Marks- 5 (MCQ-No, SAQ- Yes, LAQ- No) •

Rasa Shastra

Introduction

This sacred discipline is grounded in two prominent schools of thought:

- **Dakshinatya Sampradaya (Southern Tradition)**: Flourished in the peninsular regions of India.
- **Auttarahika Sampradaya (Northern Tradition)**: Centered in northern parts of India.

Divine Origins of Rasashastra

According to historical accounts and spiritual beliefs:

Lord Shiva, considered eternal and omniscient, shared the profound knowledge of Rasashastra with Goddess Parvati, Nandi, Shiva's sacred mount, then received this wisdom from Parvati.

The teachings were subsequently imparted to sages such as Agastya and the 18 Siddhars (Tamil sages), including Purnakesar, Pulastya, and Pulikaisar.

Development of Siddha and Natha Traditions

The practice of Mercurial science branched into two primary traditions:

Siddha Sampradaya (Southern India)

- Led by Sage Agastya and the 18 Siddhars.
- Notable figures included Tirumular, Bogar, Nandi, and Kalangi Nathar.
- The Siddhas were pioneers in utilizing mercury (Rasa) to achieve Rasa Siddhi (alchemy).

Natha Sampradaya (Northern India)

- Renowned Natha yogis such as Adinatha, Matsyendranatha, and Gorakshanatha were instrumental.
- This tradition focused on spiritual evolution and alchemical innovation.

Nagarjuna and the Spread of Rasashastra

- **Siddhanagarjuna**, a Buddhist scholar from Nalanda University, sought simpler alternatives to northern India's complex medical practices.
- Journeying to South India, he mastered the Mercurial system in Shrisailam, Andhra Pradesh.
- Upon his return to the north, he authored influential texts such as Rasendra Mangala and Kakshapula Tantra.

Mythical Event: Agastya's Southern Expedition.

During the divine wedding of Shiva and Parvati in the Himalayas, the immense gathering caused the earth to tilt. To restore balance, Shiva dispatched Agastya to South India. There, Agastya propagated the teachings of Rasashastra and established the Siddha Sampradaya.

Chronology of Rasashastra's Evolution

The historical progression of Rasashastra is divided into four key periods:

- **Vedic Period**: Rooted in the alchemical practices of the Vedas.
- **Samhita Period**:Marked by the composition of foundational texts like Charaka Samhita and Sushruta Samhita.
- **Sangraha Period**: Characterized by advanced techniques and seminal works by Nagarjuna.
- **Modern Period**: A fusion of traditional and contemporary approaches in alchemy and medicine.

Contributions of the Siddha Tradition

The Siddha system has profoundly enriched Tamil literature and cultural heritage. Notable achievements include the creation of the iconic Nataraja statue in Chidambaram and the Kumaraswami statue in Pazhani, both celebrated as alchemical masterpieces.

This chronicle highlights the enduring legacy and the rich cultural-scientific heritage of Rasashastra.

Definition

Rasa

रसनात् सर्वधातूनां रस इत्यभिधीयते।

अतस्तद्गुणयोगात् रसज्ञैः स परो मतः॥ (R.R.S. 1/7)

Mercury has the ability to encapsulate Abhrarakadi Rasa dravyas. It is believed that Rasa can make the body free from aging and death. Its benefits extend beyond humans to devas, as it helps them overcome all types of evils.

Chronological Development

- History acts as a treasure trove of knowledge, offering valuable insights into the progression of various fields and their modern advancements. By delving into historical records, we uncover foundational ideas that can be refined and expanded with the aid of contemporary science.
- Rasashastra, a specialized branch of medical science, serves as a prime example, evolving continuously by integrating historical wisdom with present-day research.
- Documentation as the Backbone of Historical Study.
- The foundation of any scientific field relies heavily on documented works from different time periods. In the realm of Rasashastra, the contributions of numerous scholars provide invaluable records that trace the discipline's origins, growth, and development over centuries.
- The journey of Rasashastra's evolution as a medicinal science can be categorized into distinct phases:
  - **Early Beginnings (2nd-3rd Century CE):** This period marks the initial exploration of Rasashastra's medicinal applications.
  - **Golden Era (8th Century Onwards):** During this time, the discipline flourished, witnessing major advancements and refinement.
  - **Stagnation and Revival:** After experiencing a lull post-16th century, the 19th century ushered in a revival, driven by the inclusion of modern chemistry. Today, Rasashastra continues to thrive, backed by technological innovations and rigorous validation.

Historical Milestones and Contributions

- **Prehistoric Roots:** The origins of Rasashastra likely extend back to the Vedic period, emphasizing its ancient heritage.
- **Early References (300-400 BCE):** Texts such as Kautilya's Arthashastra highlight its early significance.
- **Medieval Flourishing (12th-16th Century CE):** This era witnessed outstanding literary contributions that enriched Rasashastra.
- **Post-Samhita Period** : Spearheaded by figures like Siddha Nagarjuna, this phase focused on alchemical advancements.

The Need for Modern Advancements

- Despite its rich and ancient lineage, Rasashastra requires scientific validation and modernization to gain broader acceptance and application. Modern technologies present unparalleled opportunities to enhance its credibility and relevance in contemporary medicine, ensuring its continued resurgence.
- By revisiting and reinterpreting historical documentation, Rasashastra bridges the gap between ancient wisdom and modern innovation, paving the way for its transformative evolution.

Pre-Historic Period (6000-2000 BCE)

During the pre-historic era, evidence suggests the use of *musha* (mud vessels, crucibles, and similar tools) for various metallurgical processes. These included the extraction of metals from ores, such as cast iron. These primitive techniques laid the foundation for later advancements in metalworking and material processing.

- **Indus Valley Civilization (2500-1800 BCE):** Chemistry and Metallurgical Expertise.

The Indus Valley Civilization displayed a remarkable understanding of chemistry and metallurgy. Archaeological findings reveal:

- **Furnaces:** The use of three distinct types of furnaces for smelting and forging.
- **Metals:** Knowledge of metals like gold, copper, tin, lead, and iron. Copper and bronze were extensively utilized for household tools and implements.
- **Mortars:** Mortars made from gypsum, lime, and sand were discovered, indicating the advanced use of composite materials.

- **Jewelry and Ornamentation:** Use of Precious Stones The civilization had an affinity for gemstones and precious materials, which were crafted into ornaments. Gems like carnelians and agates were common, along with evidence of glass and materials such as silica, aluminum, iron, magnesium oxide, and lime. Shilajatu, known for its strength-enhancing properties, was also in use.
- **Iron Age:** Evolution of Metal Usage.

Following the Stone Age, the Iron Age marked a transformative period where metals began to dominate daily life. Tools, weapons, and implements crafted from iron and other metals became widespread.

- **Harappa and Mohenjo-Daro:** Metallic Artifacts and Everyday Use.

Excavations at Harappa and Mohenjo-Daro revealed a rich array of metallic artifacts, including:

- Axes, daggers, arrowheads, and utensils.
- Objects primarily made from copper, bronze, gold, silver, and lead.

- **Other Materials:** Gems, Minerals, and Compounds Various materials, such as bitumen, cinnabar, and a wide variety of gemstones, were also found in these ancient sites. These discoveries highlight the civilization's diverse material culture and its knowledge of mineral resources.
- **Craftsmanship and Practical Arts:** Pottery and Metallurgy

The people of this era had honed several practical arts:

- **Pottery Making and Painting:** These skills reflect aesthetic sensibilities and functional design.
- **Metallurgical Practices:** Forging, casting, and smelting were well-established processes, showcasing their advanced understanding of metallurgy.

This wealth of evidence underscores the technological and cultural achievements of ancient civilizations, particularly in material science and craftsmanship.

Vedic Period

Rigveda

- The Earth is described as "हिरण्यगर्भः समवर्तताग्रे" (Hiranyagarbhah Samavartataagye), indicating awareness of gold (svarna) and other metals.
- Knowledge of gold, copper, iron, and bronze used for crafting chariot wheels for transport and warfare.
- Ashwinikumaras performed prosthetic surgery on Vishphala, replacing her injured hip with lohadhatu (metal).
- The term dhatru (processed metal) is used instead of dhatu (natural metal), showcasing an understanding of dhumapana kriya (metal extraction).

Yajurveda

Mentions six metals

- Hiranya (Gold)
- Ayas (Copper)
- Shyama (Iron)
- Sisa (Lead)
- Trapu (Tin)

Atharvaveda

- References to materials such as pearls, shells, and gold.
- Highlights the cultural and economic importance of these resources.
- Terminology and Usage of Metals and Minerals
  - **Gold:** Referred to as harita.
  - **Silver:** Known as rajata or arjuna.
  - **Copper:** Called lohita.
  - **Other Materials**

a. **Minerals:** tala, shila, mani.

b. **Organic materials:** shankha (shells), pravala (corals).

c. **Lead (seesa):** Used for hunting wild animals.

Kautilya's Arthashastra

Kautilya's Arthashastra, authored by Chanakya, a renowned scholar, economist, and strategist of the 4th century BCE during the Gupta era, showcases remarkable knowledge of metals and minerals.

Advancements in Lohavidya (Metallurgical Science)

- This era witnessed unparalleled growth in Lohavidya (metallurgy).
- Metals and minerals found extensive application in utensils, weaponry, and even medicinal practices.

Techniques in Metal Processing

- The text details processes like Shodhana (metal purification) and Mardavakara (metal softening), reflecting advanced refinement techniques.

Categorization of Metals

- Seven metal types are identified:
  - Kalayasa (Iron)
  - Tamravritta (Bronze)
  - Kansya (Bell Metal)
  - Sisa (Lead)
  - Trapu (Tin)
  - Vakrintaka (an alloy)
  - Aarkoot (raw ore or unrefined metal)
- Identification of Metals and Gemstones
- The text provides guidelines for identifying dhatus (metals) and ratnas (gemstones).
- It classifies pearls (mukta) into three categories based on their origin:
  - Shankha (Conch Shells)
  - Shukti (Oyster Shells)
  - Prakima (Naturally Occurring Pearls)

Therapeutic Use of Metals and Minerals

- Metals and minerals served medicinal purposes both internally and externally, signifying a deep understanding of their therapeutic properties.

Gold (Suvarna) and Mercury (Parada) Applications

- The use of three types of Suvarna (gold) is documented, including Suvarna derived from Rasa (mercury), and known as Rasavidha.
- This indicates pre-existing knowledge of alchemical techniques for transforming base metals into noble ones.

Gold Refinement and Modification Techniques

- The process of Suvarna Shodhana (gold purification) is thoroughly explained.
- The use of Hingula (cinnabar) in Suvarna Vikritikarana (altering gold) underscores the era's metallurgical sophistication.

Samhita Period

Following the Vedic period, the Samhita period emerged, marked by the composition of three foundational Ayurvedic texts known as the Brihattrayi: Charaka Samhita, Sushruta Samhita, and Ashtanga Sangraha. While these treatises primarily focused on the therapeutic use of herbal medicines, references to the application of metals and minerals are also evident in certain contexts–

Charaka Samhita

- **Six Dhatus**: Charaka Samhita identifies six primary metals—Svarna (gold), Rajata (silver), Tamra (copper), Naga (lead), Vanga (tin), and Loha (iron)—recommended for both internal and external use. They were administered in forms such as fine powder (raja), churnas, or ayaskriti.
- **Medicinal Minerals**: Minerals such as Tuttha (copper sulfate), Svarnamakshika (chalcopyrite), Kasisa (green vitriol), Shilajatu (mineral pitch), Haratala (orpiment), Manahshila (realgar), Gandhaka (sulfur), Anjana (collyrium), Pushpanjana, Rasanjana, Gairika (red ochre), and Sphatika (alum) were utilized in combination with herbal formulations.
- **Applications**
  - **External Use**: Widely used in the treatment of skin disorders.
  - **Internal Use**: Prescribed for conditions such as Pandu (anaemia), Kamala (jaundice), and as Rasayana (rejuvenators).

Lohas in Vati Formulations

- **Mandoora (Iron Rust)**: Included in preparations like Mandoora Vajra Vatika, these lohas were used internally for therapeutic benefits.

Gems and Precious Stones

- **Therapeutic Use of Gems**: Substances such as Shankha (conch shell), Shukti (pearl oyster shell), Pravala (coral), Pushparaga (topaz), Manikya (ruby), and Sphatika were incorporated for their prabhava (inherent effects).
- **Special Formulation**: In conditions like Shvasa (respiratory disorders) and Raktapitta (bleeding disorders), Charaka mentions Muktadya Churna, a formulation enriched with gemstones and metals.

Specialized Applications

- **Preparation of Instruments**: Siddhisthana describes the use of Loha (iron) for crafting medical instruments like bastinetra.
- **Gold for Rituals**: The use of Svarna (gold) for Prashana (oral administration for immunity) and Pumsavana (prenatal care) is elaborated in Charaka Samhita.
- **Lohadi Rasayana**: Iron-based formulations are highlighted for their rejuvenating properties (Rasayana karma).

Metals in Specific Therapies

- **Tamra (Copper)**: Used in managing Garavisha (chronic poisoning) through emesis (vamana).
- **Svarna (Gold)**: Combined with honey in Asvishagna Yoga for specific treatments.
- **Vajra (Diamond) and Others**: Vajra (diamond), Markata (emerald), Vishamushika, and Vaidurya (cat's eye) were applied for treating venomous bites (Sarpadarshanivarana).

Nasal Administration

- **Manahshila (Realgar)**: Utilized in Pradhamana Nasya for managing Kaphaja Pratishyaya (chronic sinusitis).

Early Use of Metals and Powders

- **Administration in Raja Form**: Metals were predominantly used in powdered forms (raja), as the concept of Bhasmas (calcined metal powders) was not developed during the classical era.

Sushruta Samhita

Identification of Toxic Substances

- **Phenashma and Haratala**: Sushruta was the first to classify Phenashma (froth stone) and Haratala (orpiment) as Dhatuvisha (metallic toxins).
- **Parada (Mercury)**: There is a vague reference to Parada, which indicates its use solely for external applications.

Use of Metals and Alloys

- **Metals in Medicinal Applications**: Sushruta mentioned six metals—Vanga (tin), Naga (lead), Tamra (copper), Rajata (silver), Krishnaloha (steel), and Svarna (gold). Their Ayaskriti preparations were recommended for therapeutic purposes.
- **Classification of Lauha (Iron)**: Sushruta differentiated iron into two types:
  - **Tikshnalauha:** (sharp or strong iron).
  - **Kala Lauha:** (mild or wrought iron).

Minerals in External Applications

- **Medicinal Minerals**: Minerals such as Tuttha (copper sulfate), Kasisa (green vitriol), Sasyaka (blue vitriol), Gairika (red ochre), and Haratala were primarily used for external treatments.

Categorization of Dhatus

- **Trapvadi Gana and Usakadi Gana**: Various metals are grouped under **Trapvadi Gana** (group of metals like tin and lead) and **Usakadi Gana** (group of heat-associated substances).

Role of Metals in Surgery

- **Surgical Instruments**: Sushruta highlighted the use of metals and alloys in crafting **Yantras** (instruments) and **Shastras** (tools) essential for surgical procedures.

Innovations in Drug Preparation

- **Pakas (Cooking Methods)**: Sushruta introduced different methods of preparation, including **Sthalipaka** (processing of drugs in a pan).

Internal Use of Dhatus

- **Internal Use of Anjana**: Sushruta was the first to recommend the internal administration of Anjana (collyrium) for therapeutic purposes.
- **Dhatus for Internal Use**: Various metals and minerals were described for internal administration in the Dravya Sangrahaniya Adhyaya.

Use of Sulfur

- **Gandhaka (Sulfur)**: Sulfur was an essential component of Mahavajra Taila, prescribed for the treatment of Kushtha (skin disorders).

Development of Puta and Bhasma Concepts

- **Puta for Drug Processing**: Sushruta pioneered the Puta (incineration) process, as seen in the preparation of Tuvaraka Rasayana.
- **Antardhuma Method**: The pulp of Tuvaraka (Hydnocarpus laurifolia) was incinerated in a closed vessel, ensuring no smoke escaped.
- **Early Use of Bhasma**: In this context, the term "Bhasma" referred exclusively to the ash of vegetable substances, not metals or minerals.

Ashtanga Sangraha and Ashtanga Hridaya

External Applications of Minerals

- **Recommended Minerals for Wounds (Vranas)**: Minerals like Tuttha (copper sulfate), Gairika (red ochre), Manahshila (realgar), Haratala (orpiment), and Kasisa (green vitriol) are recommended for external application to treat wounds effectively.

Descriptions of Metallic Preparations

- **Therapeutic Uses of Metals**: Various preparations involving metals such as gold, silver, copper, iron, tin, and lead are highlighted in traditional texts for their therapeutic applications.

Mention of Precious Stones

- **Precious Stones in Ashtanga Hridaya**: The Ashtanga Hridaya mentions several precious stones, including Manikya (ruby), Mukta (pearl), Pravala (coral), Marakata (emerald), Vajra (diamond), Vaidurya (cat's eye), Suryamani (sunstone), and Sphatika (quartz), for their medicinal and energetic properties.

Shukla Varga Dravyas

- **White Group Substances**: The texts reference substances classified under the "Shukla Varga," including Shankha (conch shell), Shukti (pearl oyster), Varatika (a medicinal ingredient), and Samudraphena (marine resin).

Marana Concept in Ashtanga Sangraha

- **Early Metallic Processing**: The concept of Marana (processing of metals) is detailed in the Ashtanga Sangraha and Hridaya, with descriptions of purification techniques like Ghatimusha and Andha Musha for Dhamana (refinement).

Evolution of the Dhatubhasma Process

- **Dhatubhasma Development**: During the time of Vriddha Vagbhatta, advance-ments in producing Dhatubhasma (calcined metals) were documented, including the intro-duction of Bhanupaka Vidhi for processing iron (Lohamarana).

Uttaratantra Preparations

- **Enhancement of Reproductive Tissue (Shukradhatu Vriddhi)**: The Uttaratantra section of Ashtanga Sangraha describes a preparation to enhance reproductive tissue (Shukradhatu), incorporating mineral ingredients like Shilajatu (mineral pitch), Loha Churna (iron powder), Parada (mercury), and Svarnamakshika (chalcopyrite).

Properties of Dhatus

- **Rasa, Veerya, and Vipaka**: The Ashtanga Sangraha explains the Rasa (taste), Veerya (potency), and Vipaka (post-digestive effect) associated with different metals and minerals (dhatus).

Internal Use of Parada

- **Therapeutic Use of Mercury**: The Rasayana Prakarana of Ashtanga Sangraha records the internal administration of Parada (mercury) for the first time, emphasizing its therapeutic significance.

Preparations for Vicharchika Treatment

- **Oils for Skin Disorders**: Ingredients such as Siktha (wax), Sindhoora (vermillion), Tuttha (copper sulfate), and Tarkshya are used in medicinal oil formulations to treat Vicharchika, a type of skin disorder.

Medieval Period

Acharaya Nagarjuna

- The foundational evolution of Rasa Shastra occurred during Nagarjuna's time.

- Numerous valuable Rasa preparations and their pharmaceutical techniques were developed.
- Nagarjuna studied under Acharya Sarabha at Nalanda Vidyapitha.
- He had expertise in Mayurividya and mastered Kritrim Svarna Nirmana (artificial gold preparation) from Parada (mercury).

Acharya Gorakshanatha

Developed Khechari Gutika and Suvarna nirmanartha gutika kalpa formulations.

Rasa Ratna Samucchaya

- Authored by Vagbhatta, it is a comprehensive treatise on Rasa Shastra.
- Consolidates scattered knowledge of Rasa Shastra into a systematic text.
- Covers pharmaceutical, therapeutic, and the eight branches of Ayurveda.

Rasa Hridaya Tantra

- Focuses on the Ashtadasha Parada Samskara (18 special mercurial processing techniques).
- Guides on making mercury suitable for alchemical transmutations and therapeutic applications.

Rasa Ratnakara

- Describes techniques such as Kritima Manik-yanirmana (artificial gemstone synthesis) and Indranila Nirmana (artificial sapphire creation).

Anandakanda

- Provides an extensive explanation of Rasa Shastra.
- Elaborates on the concepts of Dehavada (human body enhancement) and Lohavada (metal alchemy).

Development of Rasa Shastra in the Modern Era

Bhaishajya Ratnavali

- Written by Kavi Raj Govinda Das Sen in the 18th century.
- Compiled knowledge from texts like Chakradutta, Rasendra Sara Sangraha, and Charaka Samhita.
- Details on preparation techniques for Vati, Bhasma, Kvatha, and herbomineral formulations.
- Lists pathya (recommended) and apathya (non-recommended) regimens for various diseases.

Rasatarangini

- Written by Acharya Sadananda Sharma.
- Contains 24 chapters (Tarangas) and 3651 verses.
- Emphasizes realistic and feasible pharmaceutical techniques for drug preparation.
- Mentions acids like Sulphuric Acid, Sora Kamla, and Lavana Amla for practical applications.

Rasamritam

- Authored by Acharya Yadavji Trikamji in 1951.
- Integrates older Rasa texts with contemporary concepts.
- Provides systematic classifications and includes influences from Unani medicine.
- Highlights the amalgamation of modern chemistry and Rasa Shastra.

Rasa Yoga Sagara

- Written by Shri Hariprapanna Sharma in 1930.
- Collects formulations from classical texts while adding new ones.

Kupipakva Rasa Nirmana Vigyana

- Authored by Vaidya Harisharnananda.
- Details 258 Kupipakva rasayana formulations and their preparation techniques.

Ratna Dhatu Vigyana

- Written by Shri Badrinarayana Shastri.
- Covers Ratnas (gemstones), Upratnas (semi-precious stones), and minerals.
- Discusses unique substances like Uranium, Chromium, and Cryolite in addition to traditional materials.

Significance of Rasa Shastra

- Initially, Rasashastra was developed with the primary goal of Lohavedha—transforming base metals into precious ones.
- Over time, later texts shifted focus to Dehavedha, emphasizing life extension and disease-free positive health.

Vital Role in Disease Management

Rasaushadhis are pivotal in both preventing and treating illnesses, surpassing plant or animal-based formulations in effectiveness.

Advantages over Other Formulations

- **Lower Dosages**: Requires smaller therapeutic doses.
- **Rapid Action**: Acts faster than traditional formulations.
- **Long Shelf Life**: Offers extended stability compared to herbal or animal-origin medicines.
- **Synergistic Effects**: Enhances the potency of other ingredients in formulations.
- **Geriatric Care**: Particularly effective in elderly patients.

Therapeutic Applications and Nano-Level Precision.

Dosage Forms

- Administered as bhasmas and sindhooras, which feature micro and nano-sized particles.

Research-Backed Benefits

- Proven to be safe, effective, and highly absorbable due to their reduced particle size.
- Smaller particles enhance assimilation, making them easily absorbed and bioavailable.
- The colloidal nature further aids in optimal therapeutic outcomes.

अल्पमात्रोपयोगित्वादरुचेर प्रसङ्गतः।
क्षिप्रमारोग्यदायित्वादीषधेभ्योऽधिको रसः।। (R.R.S. 1/4)

Rasoushadhis are regarded as highly effective medicinal preparations due to several key factors:

- **Minimal Therapeutic Dosage**: They require only a small amount for effective treatment, making them convenient to use.
- **Neutral Taste**: Their tasteless nature enhances patient compliance, as they can be easily administered without aversion.
- **Rapid Therapeutic Effects**: These medicines provide swift relief and effectively address various health conditions, promoting quick recovery.

स्वल्पा हि मात्रा विपुला गुणाश्च सद्यो हि तद्दीपनपाचनं च।
यस्यास्ति तं चेन्न भजन्ति मत्र्यास्ते पूर्वजन्मार्जितपापमूढाः।
(R.Chu. 1/33)

- Rasoushadhis exhibit remarkable efficacy, delivering a wide range of benefits even in minimal dosages.
- These preparations serve dual purposes as appetizers (Deepaka) and digestive aids (Pachaka), enhancing overall digestive health.
- Additionally, they have been noted for their effectiveness in alleviating ailments believed to stem from karmic consequences of past lives.

माध्येषु भेषजं सर्वमीरितं तत्त्ववेदिना।
असाध्येष्वपि दातव्यो रसोऽतः श्रेष्ठ उच्यते।। (R.R.S. 1/5)

While experts can effectively treat sadhya rogas with various medications, Rasa (Parada) and its associated formulations can also be utilized for asadhya rogas. Therefore, rasoushadhis are regarded as the most superior medicines available.

Bhaishajya Kalpana

Bheshaja (भेषज)

रोगभयं जयतीति भेषजम्।
भेषं रोगं जयतीति औषधम् इत्यमरः।। (Shabdakalpadruma)
तदेव युक्तं भैषज्यं यदारोग्याय कल्पते। (Cha. Su. 1/134)

"Bheshaja" or "Bhaishajya" refers to substances or treatments that alleviate the fear of disease or restore health by balancing the doshas.

In Ayurveda, the concept of "Padachatushaya" refers to the four categories of essential elements necessary for the sustenance of life. These categories are Bheshak (Physician), bheshaja (medicine), Paricharaka (Attendant), and Rogi (Patient). Among these, bheshaja, or medicine, holds a significant position, being essential for the treatment of diseases and the preservation of health.

Prashasta Bheshaja Lakshana

बहुता तत्रा योग्यत्वमनेकविध कल्पना संपच्चेति चतुष्कः अयं द्रव्याणां गुण उच्यते (Cha. Chi. 1/3)
बहुकल्पं बहुगुणं संपन्नं योग्यमौषधम्। (A.H. Su.1/28)

Emphasizing bheshaja in Ayurvedic texts like those of Charaka and Vagbhata highlights its importance in maintaining well-being. Bheshaja, is valued for its applicability, quality richness, abundance, and versatility in addressing various health concerns. Hence Bheshaja is kept in second position among the padachatushaya because of its great role in treatment grounds.

While food is essential for nourishment, medicine plays a vital role in restoring health during imbalances or diseases, emphasizing the significance

of using appropriate medicines for overall health and illness management.

Kalpana (कल्पना)

Kalpana is orginated from kalpa word –

कृप् सामर्थ्य धातु and **अच् प्रत्यय** = Kalpana

कल्प्यते विधीयते असौ विधिः। (Shabdakalpadruma)

- "Kalpana" in Ayurveda refers to the various methods or processes employed in the preparation of pharmaceutical products. These methods are critical to the formulation of medicines and include a range of techniques such as grinding, heating, frying, and boiling.
- Each technique serves a specific purpose, contributing to the efficacy, safety, and preservation of the final product, ensuring that the medicinal properties of the ingredients are maximized and harmonized for therapeutic use.

कल्पनं योजनमित्यर्थः। (Arunadatta)

- Kalpana refers to the strategic planning and methodology involved in the preparation of Ayurvedic medicines.

कल्पनमुपयोगार्थं प्रकल्पनं संस्करणमिति यावत् स्वरसादिबहुलक्षणम्। (Chakarpani)

- Kalpana refers to the processing of substances for consumption in various forms, such as juice and other preparations.

Chronological Development

Origins of Ayurveda

1. **Divine Perception and Dissemination**: Ayurveda is believed to have originated from the divine knowledge of God Brahma, who first perceived it. He passed this science to Daksha-Prajapati, who then taught it to the Ashvini-kumaras. The Ashvini-kumaras further shared this knowledge with God Indra.
2. **Variation in Lineage Among Texts**
   - **Sushruta Samhita**: Lord Indra transmitted Ayurveda to Lord Dhanvantari, who then taught Divodasa. Divodasa passed this knowledge to Sushruta and other disciples, including Aupadhenava, Aurabhra, Pauskalavata, Gopurarakshita, and Bhoja.
   - **Charaka Samhita**: Bharadvaja learned Ayurveda from Lord Indra and shared it with Atreya Punarvasu. Atreya taught this science to students like Agnivesha, Bhela, Jatukarna, Parashara, Harita, and Ksharapani.
   - **Kashyapa Samhita**: Lord Indra imparted Ayurveda to sages Kashyapa, Vashistha, Atreya, and Bhrigu.
3. **Classification into Two Schools**

The Ayurvedic tradition is broadly classified into:

- **Atreya School**: Focused on medicine (Kayachikitsa).
- **Dhanvantari School**: Specialized in surgery (Shalyatantra).

Fundamental Principles of Ayurveda

- Balancing the Tridosha Ayurveda aims to maintain equilibrium among the three fundamental energies—Vata, Pitta, and Kapha—collectively known as Tridosha. These are the core elements governing the human body.
- **Source of Ayurvedic Drugs**: Ayurvedic formulations are derived entirely from natural resources, including plants, animals, and minerals.

Types of Ayurvedic Formulations

1. **Kasthauashadhi (Plant-Based Formulations)**
   - Primarily composed of herbal ingredients.
   - Covered under Bhaishajya Kalpana.
   - Examples include Asava-Arishta, Avaleha, Ghrita, Churna, Taila, etc.
2. **Rasaushadhi (Mineral and Metal-Based Formulations)**
   - Predominantly prepared using metals and minerals.
   - Addressed in Rasashastra.
   - Examples include Bhasma, Pishti, Lauha, Mandura, Kupipakva Rasayana, etc.

Vedic Period

Origins in the Vedic Era

- The Vedas, the earliest Indian scriptures, serve as the primary records of knowledge. Ayurveda, recognized as the Upaveda of the Atharva

Veda, introduced formulations for addressing numerous human ailments.

- The history of Bhaishajya Kalpana can be traced back to the Vedic period, where its foundational principles were established.

Aushadha and Ahara Kalpanas in the Vedas

- The Vedas provide evidence of early Aushadha (medicine) and Ahara (dietary) formulations.
- During this time, Ekamulika Prayoga (use of single drugs) was a prevalent practice.
- Preparations such as Svarasa (fresh juice), Kvatha (decoction), and Churna (powder) were developed using various herbs, laying the groundwork for Ayurvedic medicinal formulations.

Rigveda

- The Rigveda contains detailed descriptions of several medicinal plants, such as Kimsuka (Palasha), Khadira, Durva, and Kamala.
- Soma, considered one of the most significant medicinal plants, is prominently featured along with its preparation, Somarasa Kalpana.
- Other formulations, including Abhisava Kalpana (fermented preparations), are also mentioned.

Atharvaveda

- The Atharvaveda expands on the medicinal properties of plants like Apamabhriga, Arka, Ashvattha, Khadira, Tila, Arjuna, Yava, Pippali, Prishniparni, Bilva, Udumbara, Ikshu, Laksha, Sahadevi, Soma, and Guggulu.
- Formulations such as Sura Kalpana (fermented beverages) and Madya Kalpana (alcoholic preparations) are also described.

Yajurveda

- The Yajurveda documents substances related to dietary and medicinal use, including Saktu (flour), Parivapa (fried grains), Dadhi (curd), Soma, Madhu (honey), Godhuma (wheat), Masura (lentils), Mudga (green gram), Masha (black gram), Tila (sesame), and Priyangu (millet).

Comparison of Vedic and Bhaishajya Kalpana Formulations

- Vedic formulations, such as Svarasa, Kvatha, and Madya Kalpana, have evolved into structured Bhaishajya Kalpana methods.
- The Vedic texts provided a comprehensive foundation for Ayurvedic medicinal practices, preserving their significance in modern Bhaisajya Kalpana.

Samhita Period

Classical Texts and Their Contributions

- Renowned Ayurvedic classics like Charaka Samhita, Sushruta Samhita, Kashyapa Samhita, Bhela Samhita, Ashtanga Sangraha, and Ashtanga Hridaya extensively discuss medicinal formulations, their preparation, composition, and therapeutic actions, along with other aspects of the Ayurvedic medical system.

Texts on Compound Formulations

- There are numerous authoritative texts addressing both categories of formulations: Kashthausadhis (herbal formulations) and Rasaushadhis (mineral and metallic formulations).
- Comprehensive works like Sharngadhara Samhita, Chakradatta, Bhaishajya Ratnavali, Bheshaja Kalpa, Sahasrayogam, and Bharat Bhaishajya Ratnakara cover both formulation groups.
- Specific texts like Rasendra Sara Sangraha, Rasaratna Samuccaya, Rasaprakasha Sudhakara, Ayurveda Prakasha, Rasatarangini, and Rasayoga Sagara focus exclusively on Rasaushadhis.

Nighantu Literature

- Works such as Dhanvantari Nighantu, Kaiyadeva Nighantu, Bhavaprakasha Nighantu, and Raja Nighaantu provide detailed descriptions of single drugs, focusing on their habitats, characteristics, and therapeutic effects.

Charaka Samhita

- **Panchavidha Kashaya Kalpanas (Five Primary Preparations)**
- Charaka Samhita: Elaborates on five essential pharmaceutical processing techniques, collectively termed Panchavidha Kashaya Kalpanas.
- **Svarasa Kalpana** : Fresh juice preparation.
- **Kalka Kalpana** : Paste formulation.
- **Kvatha Kalpana** : Decoction preparation.
- **Hima Kalpana** : Cold infusion.
- **Phanta Kalpana –** Hot infusion.

Detailed guidelines on processing techniques, dosage, Anupana (vehicle or catalyst), and administration methods for these preparations are provided.

Mahapanchavidha Kashaya Ganas

- Herbal drugs are classified into 50 Mahapanchavidha Kashaya Ganas based on their pharmacological properties, such as Jivaniya Gana and Brimhaniya Gana.

Advanced and Long-lasting Formulations

- Due to the limited shelf life of Panchavidha Kashaya Kalpanas, formulations with extended preservation potential are described in Chikitsa Sthana. These include:
  - Churna Kalpana (powder formulations).
  - Vati Kalpana (tablets or pills).
  - Ghrita and Taila Kalpanas (ghee and oil preparations).
  - Avaleha Kalpana (herbal linctus).
  - Asava and Arishta Kalpanas (fermented preparations).

Specialized Preparations for Panchakarma

Specific formulations for Panchakarma therapies, such as Vamana Kalpana (emesis), Virecana Kalpana (purgation), Vasti Kalpana (medicated enema), and Nasya Kalpana (nasal medication), are elaborated in Kalpa Sthana and Siddhi Sthana.

Selective Use of Plant Parts

Based on the active principles present in specific plant parts, these are selectively chosen for medicinal purposes. This classification, mentioned in Sutra Sthana, categorizes plants into groups like Mulini (root-based) and Phalini (fruit-based).

Dietetic Principles in Charaka Samhita

Ten Guidelines for Wholesome Food Intake Vimana Sthana outlines ten principles for a wholesome diet:

- Food should be consumed hot.
- It should be unctuous.
- Proper quantity should be consumed.
- The next meal should be taken only after digesting the previous one.
- Food ingredients should not have contradictory potencies.
- Meals should be taken in a pleasant environment with necessary accessories.
- Food should not be eaten in haste.
- Eating should not be excessively slow.
- One should avoid talking or laughing while eating and focus solely on the meal.
- Only food compatible with an individual's physical constitution and mental disposition should be consumed.

Sushruta Samhita

- Recognized as a foundational text on Shalya Tantra (surgery), the Sushruta Samhita provides significant insights into formulations designed for wound cleansing (Vranashodhana), wound healing (Vranaropana), and the treatment of abscesses (Vidhradhi Chikitsa). It also outlines remedies for various surgical challenges, including pre-operative, operative, and post-operative complications.
- Detailed descriptions are provided regarding the preparation methods, pharmacological properties, dosage regulations, and administration techniques for these formulations.

The Sushruta Samhita identifies six primary types of medicinal preparations:

1. Kshira
2. Rasa (Svarasa)
3. Kalka
4. Shrita (Kvatha)
5. Sita
6. Phanta

Sushruta's Perspective on Drug Potency

Through a thorough examination of various theories, Sushruta emphasizes that the curative power of a drug lies in its potency (Veerya). While acknowledging that potency cannot exist without the substance itself, he underscores the primary importance of the drug in therapeutic practices.

Innovations in Medicinal Preparations

- Sushruta pioneered techniques for preparing medicinal ghee (Ghrita) and oils (Taila). Notable innovations include Shatadhauta Ghrita (ghee washed 100 times), Sahasrapaka Taila (oil cooked 1,000 times), and Kumbha Ghrita (ghee aged for 100 years). These methods reflect his advanced understanding of drug potentiation and preservation.
- Sushruta also highlighted the therapeutic benefits of goat-derived substances. For instance, he noted that tubercular bacilli do not thrive in

goat's blood and advocated the use of goat's milk to address colitis and intestinal fermentation.

- Furthermore, the therapeutic potential of close contact with goats in treating tuberculosis (Phthisis) was first demonstrated in the Sushruta Samhita.

Antiseptic Practices

- Sushruta introduced the concept of fumigating sickrooms with antiseptic preparations such as Ashtanga Dhupa.
- This practice, rooted in Indian tradition, parallels the modern use of antiseptic inhalers like Coghill's respirators.

Medicinal Forms in Sushruta Samhita

The text mentions an extensive range of medicinal formulations, including:

- **Oils and Ghee**: Shatadhauta Ghrita, Kumbha Ghrita, and Tailapaka.
- **Decoctions and Infusions**: Kvatha, Phanta, and Sita.
- **Powders and Pastes**: Churna, Kalka, and Lepa.
- **Fermented Preparations**: Asava and Arishta.
- **Other Forms**:Varti, Modaka, Rasakriya, Vati, and Leha.

Comprehensive List of Kalpanas

- The Sushruta Samhita includes a detailed list of 96 formulations, ranging from basic preparations like Svarasa and Phanta to complex forms such as Rasayana and Sandhana Kalpana (fermented preparations like Asava and Arishta).
- It also provides insights into various therapeutic foods, including Yavagu (gruel), Peya (thin soup), and Mamsarasa (meat soup), alongside instructions for their preparation and usage.
- Sushruta's contributions laid a strong foundation for surgical and medicinal practices, making the Sushruta Samhita an invaluable resource in Ayurveda.

Kashyapa Samhita

Definitions and Preparations in Ayurveda

Terminology

- **Aushadhi**: Refers to medicinal herbs or plants used for therapeutic purposes.
- **Bheshaja**: Encompasses formulations derived from herbal and mineral substances for healing.
- **Bhaishajya**: Refers to the medicines or remedies prescribed for treatment.
- **Agada:** Pertains to antidotes or treatments for poisoning.
- **Kashaya**: Refers to decoctions, typically prepared from herbs or other substances.

Seven Preparations

- **Churna** : A powdered form of medicinal herbs.
- **Sitakashaya** : Cold infusion of herbs.
- **Kalka** : A paste made from fresh herbs.
- **Kvatha** : A decoction prepared by boiling herbs in water.

Dietary Importance

- Emphasizes that diet (ahara) is considered the most significant medicine, with descriptions of twenty-five varieties of soups.

Dosage Considerations

- The Sushruta Samhita briefly mentions dosage guidelines for children, whereas the Kashyapa Samhita provides extensive details on this topic.

Recipes in Kashyapa Samhita

- Recipes can be categorized under specific headings, including:
- **Arishta Kalpana**: Various formulations like Abhayarishta and Kutajarishta.
- **Dhupa Kalpana**: A comprehensive list of fumigation methods for diverse therapeutic purposes, with classifications such as pratidhupa and anudhupa.
- **Lehya Kalpana:** Medicinal pastes with specific indications and contraindications, including Kalyanaka leha and Katukavindu avaleha.

Other Preparations Mentioned

- Agneyadhupa, Bhadrankara dhupa, and Mahadhupa are examples of specific fumigations.
- Other formulations like Abhaya guda, Agastyaharitaki, and Chakshusyaraskriya are listed under various categories.
- Ghrta Kalpana (Ghee Preparations):
- Includes formulations such as Abhaya ghrita, Amrita ghrita, and Kalyanaka ghrita.
- Taila Kalpana (Oil Preparations):

Comprises a range of medicinal oils like Ananta taila, Gandharva taila, and Yashtimadhuka taila.

Harita Samhita

1. **Kvatha (Decoction) Preparation :** The text provides a comprehensive explanation of various types of Kvatha, focusing on their unique pharmaceutical characteristics.
2. **Pharmacological Aspects :** Detailed insights into the pharmacological properties of different Kvatha formulations are presented, highlighting their therapeutic applications.
3. **Additional Formulations:** The book also includes descriptions of other medicinal preparations, expanding the understanding of Ayurvedic formulations beyond Kvatha.

Sangraha Kala

- **Time Period:** The Sangraha Kala spans the 8th to 13th centuries, encompassing the eras of Ashtanga Sangraha and Ashtanga Hridaya.
- **Influence of Historical Figures:** This period witnessed the continuation and adaptation of knowledge from prominent figures such as Acharya Charaka, Sushruta, and Kashyapa, with some modifications to their teachings.
- **Impact of Buddhism:** The influence of Gautama Buddha significantly shaped the cultural and medicinal practices of the time, fostering advancements in Ayurvedic medicine.
- **Golden Era of Rasashastra:** The 8th to 13th centuries are recognized as the Golden Era of Rasashastra, marked by substantial developments in the field.
- **Innovations in Rasashastra:** Numerous Rasashastra formulations were developed during this time, with Acharya Nagarjuna contributing important texts on both Rasashastra and Bhaishajya Kalpana.
- **Interconnection of Rasashastra and Bhaishajya Kalpana:** The advancements in Rasashastra were closely linked to Bhaishajya Kalpana, highlighting their interconnected nature in Ayurvedic practices.
- **Pharmaceutical Processes:** The period saw extensive use of herbs in the pharmaceutical preparation of Rasaushadhis, emphasizing the significance of Bhaishajya Kalpana in this context.
- **Significance of Bhaishajya Kalpana:** The developments during this era underscore the importance of Bhaishajya Kalpana, marking it as a critical phase for the evolution of medicinal formulations.

Post-Samhita Period

- **Political Instability**: Development of Bhaishajya Kalpana slowed, but innovations like Sarabatha, Gulkanda, Panaka, and Malahara emerged.
- **British Rule**: Ayurvedic practices faced setbacks due to the rise of allopathy, but modern machinery and systematic packaging in Ayurvedic pharmacies enabled mass production and efficiency.

Sharngadhara Samhita

Key Contributions :

- **Comprehensive Guide**: Clear definitions, easy-to-prepare recipes, and practical methods make it a handbook for Ayurvedic practitioners.
- **Introduction of New Drugs**: Incorporated substances like opium into Ayurvedic practice.
- **Parenteral Techniques**: Introduced Suchikabharana Rasa, directly administered into the bloodstream for critical conditions like coma and snakebites.
- **Legacy**: Sharngadhara's advancements in formulations, clinical applications, and parenteral methods established a foundation for Ayurvedic developments and positioned his work as a cornerstone of the Laghutrayi.

Chakradatta (Chakrapani, 11th Century A.D.)

- **Extensive Formulations:** The text introduces numerous **Kvatha Yogas** alongside other preparations such as **Kalka**, **Churna**, **Ghrita**, **Taila**, **Arishta**, **Guda**, **Gutika**, **Modaka**, **Mamsarasa**, and **Lepa**, with comprehensive descriptions of their therapeutic applications.
- **Foundational Ayurvedic Text**: Acknowledged as the first extensive handbook of the medieval era, **Chakradatta** served as a cornerstone for Ayurvedic practitioners and remained a key reference for centuries.
- **Mineral-Based Formulations:** It introduced innovative remedies like **Rasaparpati** and advanced the use of **iron** and other minerals in medicinal practices.

- **Innovative Therapies**: The text presented novel treatments and formulations, addressing a variety of disorders with precision.

Gadanigraha

- **Pharmaceutical Chapters:** Organized thematically, the text focused on pharmaceutical preparations such as **Tailadhikara**, **Ghritadhikara**, and **Churnadhikara**, underscoring the importance of **Bhaishajya Kalpana**.
- **Systematic Detailing:** Provided a well-structured account of various Ayurvedic formulations, their preparation methods, and clinical applications.

Bheshaja Samhita

- **Specialized Compilation:** This text, forming the **seventh chapter** of **Ayurveda Sudhanidhi** (525 verses attributed to **Bhagavan Bharadvaja**), was devoted exclusively to **Bhaishajya Kalpana**.
- **Holistic Content:**
  - Seasonal and regional drug collection.
  - Substitution for rare ingredients.
  - Pharmaceutical processing techniques.
  - Standards for weights and measures.
- **Regional Contributions**: Highlighted unique South Indian drugs like **Kuppameni** and **Pei Meratti**, reflecting a connection to the region.

The Ayurvedic Formulary of India (AFI) - Part I

AFI Part-I was first published in 1978, consolidated information from classical Ayurvedic texts to develop pharmacopoeial standards under the Drugs and Cosmetics Act. Over 24 years, advancements in identifying drug components, preparation methods, and standardization emerged, alongside challenges such as ingredient scarcity, substitution, and environmental regulations.

The second edition introduced

- Comprehensive lists of drugs with English and botanical names.
- Translations of Ayurvedic terms and therapeutic uses.
- Original Shlokas as references.
- Alternatives for unavailable plant parts.

This edition enhanced accessibility and international relevance for global users.

The Ayurvedic Formulary of India (AFI) - Part II

The English version of AFI Part II includes 191 Ayurvedic formulations with detailed preparation methods for various categories like asava, kvatha, guggulu, and bhasma.

Features

Scientific names for plant, mineral, and metal-based drugs.

Definitions, terminologies, and toxic drug purification methods.

Disease-specific formulations for ease of use by scientists, pharmacists, and students.

The Ayurvedic Formulary of India (AFI) Part-III

AFI Part-III was officially published in 2011 by the ministry of Ayush, Government of India. It contains Asava- Arishta 17 in no, Arka- 14 in no, Avaleha/ Leha/ Paka- 20 in no, Kwatha Churna- 30 in no, Guggulu- 7 in no, Churna- 69 in no, Taila- 26 in no, Lavana- 02 in no, Leapa- 23, Vati/ Gutika- 26 in no, Netra Bindu- 02 in no, Parpati- 01 in no, Pishti- 01 in no, Mandura- 04 in no, Rasayoga- 96 in no, Lauha- 11 in no, Dhupana- 01 in no.

Pharmacopoeial Standards for Ayurvedic Formulations

The revised edition by C.C.R.A.S., New Delhi covers 431 formulations in 21 categories, with appendices detailing preparation methods, storage guidelines, and single drug lists of animal, mineral, and plant origins. This edition supports ethical Ayurvedic practices, benefiting manufacturers, physicians, and consumers.

Significance of Bhaishajya Kalpana

- Acharya Charaka, in Charaka Samhita Sutra Sthana 1/126, emphasizes that even a poison can act as an effective remedy when used wisely, while the careless application of an elixir can lead to adverse effects. Thus, employing a drug thoughtfully, along with appropriate processing, is of utmost importance—an objective achievable through the principles of Bhaishajya Kalpana.
- Enhancing Drug Potency through Bhai-shajya Kalpana.
- Bhaishajya Kalpana focuses on various processing techniques that enhance the potency of medicinal substances.

अल्पस्यापि महार्थत्वं प्रभूतस्याल्पकर्मताम्।
कुर्यात् सम्योग विश्लेष काल संस्कारं युक्तिभिः।
(Cha. S.Kal. 12/48)

This verse highlights that even a simple drug can be transformed into a highly effective remedy through straightforward processes such as Samyoga (combination), Vishlesha (separation), Kala (time-related processing), Samskara (modification techniques), and Yukti (intellectual insight and application after thorough analysis).

Type of med → Rasaushadha - mercurial, herbo-mineral, metallic
Rasaratnasam -6.

Improving Patient Acceptance

- This scientific approach details various methods that make drugs more palatable, aesthetically pleasing, and easier to administer, ultimately enhancing patient acceptance.

Maximizing Efficacy and Shelf Life

- The diverse procedures outlined in this discipline facilitate the extraction of maximum active principles from drugs, significantly increasing their bioavailability.
- Additionally, the variety of formulations discussed in Bhaishajya Kalpana extends the shelf life of preparations, enabling them to be preserved for longer periods and utilized during times and in places where the original drug may not be available.

Concept of Rasashala

A Rasashala is a facility dedicated to the preparation of Ayurvedic medicines. Classical Rasashastra texts provide a comprehensive account of the Rasashala, detailing its layout, ideal location, interior design, and the thoughtful organization of various sections. Additionally, these texts emphasize the qualifications and characteristics required for the personnel involved in the pharmaceutical process.

Ideal Location for Rasashala

रसशालां प्रकुर्वीत सर्वबाधाविवर्जिते।
सर्वौषधिमये देशे रम्ये कूपसमन्विते।।
यक्षत्र्यक्षसहस्त्राक्ष दिग्विभागे सुशोभिने।
नानोपकरणोपेतां प्राकारेण सुशोभिताम्।। (R.R.S. 7/1-2)

- **Tranquility and Accessibility**: The Rasashala should be situated in a serene environment, free from disturbances or external obstructions, ensuring a peaceful workspace for medicine preparation.
- **Proximity to Medicinal Herbs**: The chosen location must have an abundance of medicinal plants in the vicinity or provide favorable conditions for their cultivation, ensuring easy access to raw materials.
- **Abundant Water Resources**: Aesthetic appeal and functionality should align, with the Rasashala built in a picturesque area enriched by natural water sources such as wells, rivers, or lakes.
- **Auspicious Direction**: For optimal energy flow, the pharmacy should be strategically positioned in the northern, northeastern (Eashanya), or eastern direction of the premises.
- **Secure and Well-Equipped Infrastructure**: The building must feature strong boundary walls for protection and be fully equipped with all essential instruments and facilities to support the efficient manufacturing of medicines.

आतङ्करहिते देशे धर्मराज्ये मनोरमे।
उमामहेश्वरोपेते समृद्धे नगरे शुभे।। (R.R.S. 6/11)

- The Rasashala should be established in a location free from any form of fear or anxiety.
- It must be situated in a realm governed by virtue, honesty, and righteous principles.
- The ideal site should resonate with the divine presence of Lord Shiva and Parvati, flourishing with positivity and prosperity.

Division

शालायाः पूर्वदिग्भागे स्थापयेद्रसभैरवम्।
वह्निकार्माणि चाग्नेये याम्ये पाषाणकर्म च।।
नैर्ऋत्ये शस्त्रकर्माणि वारुणे क्षालनादिकम्।
शोषणं वायुकोणे च वेधकर्मोत्तरे तथा।।
स्थापनं सिद्धवस्तूनां प्रकुर्यादीशकोणके। (R.R.S. 7/3-5)

- **Deity Installation (East)**: The eastern section is designated for enshrining Rasabhairava, where daily worship and rituals can be performed.
- **Heating Processes (South-East)**: The south-east corner is ideal for heating-related tasks such as incinerating metals, boiling, and other thermal operations.
- **Grinding Operations (South)**: The southern side is reserved for Pashana Karma, including grinding, pulverizing, and similar mechanical operations.
- **Cutting and Processing (South-West)**: The south-west corner is suitable for cutting tasks, extracting blood, processing useful animal components, and grinding leaves into coarse or fine powders.
- **Washing Activities (West)**: The western section is appropriate for all washing-related activities, utilizing water as part of the procedures.
- **Drying Procedures (North-West)**: The north-west area is allocated for drying operations, ensuring efficient moisture removal.

- **Boring and Transmutation (North)**: The northern direction is designated for boring processes and the transmutation of metals, aligning with the transformative aspect of alchemical practices.
- **Medicine Storage (North-East)**: Prepared medicines should be safely stored in the north-east direction, reflecting its association with preservation and protection.

Qualities of Paricharak

महाया: सोद्यमास्तत्र यथा शिष्यास्ततोऽधिका: ।
कुलीना: स्वामिभक्ताश्च कर्तव्या रसकर्मणि ।। (R.R.S. 6/7)

1. The assistants working in manufacturing units must maintain proper hygiene at all times.
2. They should demonstrate courage and confidence in efficiently performing their assigned duties.
3. Physical strength is essential to handle the demanding workload of the unit effectively.

Qualities of Drug Keeper

1. Individuals with sufficient experience and familiarity with the names of raw materials and finished products should be selected for this role.
2. The selected person must possess cleanliness and a pleasant nature.
3. They should also exhibit strong general knowledge.
4. Proficiency in multiple languages is essential to facilitate effective communication with customers. Such a candidate is ideal for the role of a drug keeper.

Bheshajagara/Rasa-Mandapa

तत्समीपे समे दीप्ते कर्तव्यं रसमण्डपम् ।।
अतिगुप्तं सुविस्तीर्णं कपाटार्गलशोभितम् ।
ध्वजच्छत्रविताना‌ढ्यं पुष्पमालाविलम्बितम् ।
भेरीकाहलघण्टादि शृंगीनादविनादितम् ।।
भू: समा तत्र कर्तव्या सुदृढा दर्पणोपमा ।
तन्मध्ये वेदिका रम्या कर्तव्या लक्षणान्विता ।। (R.R.S. 6/14-16)

- Within the premises of the laboratory, Rasamantapa, a dias-like structure with pillars, umbrellas, and flags will be installed in a hidden place.
- It should be adorned with flowers and garlands of green leaves.
- At the center of this space, a high platform will be set up to hold a Rasa Linga—an oval-shaped representation of Lord Shiva made from solidified mercury.

Preparation of the Rasa Linga

निष्कत्रयं हेमपत्रं रसेन्द्रं नवनिष्ककम् ।
अम्लेन मर्दयेद्याममं तेनलिङ्गं तु कारयेत् ।।
दोलायन्त्रे सारनाले जम्बीरस्थं दिनं पचेत् ।
तल्लिङ्गं पूजयेत्तत्र सुशुभैरुपचारकै: ।। (R.R.S. 6/17-18)

- **Initial Mixing and Grinding:** Zero grams of gold and 90 grams of mercury are placed in a mortar and ground together using sour liquids for one Yama (approximately three hours) until the mixture solidifies.
- **Shaping and Encapsulation:** The solidified mixture is molded into an oval shape (*lingakara*) and placed inside a lemon fruit.
- **Boiling in Sour Liquids:** The lemon, containing the Rasa Linga, is immersed in sour liquids and boiled for 24 hours.
- **Final Rituals and Worship:** Once the process is complete, the Rasa Linga is removed and worshipped while chanting the *Rasankusi* and *Aghora* mantras. This practice is believed to bring unending prosperity and ensure the smooth functioning of the laboratory or pharmacy.

Design and Worship of the Rasa Mantapa

वज्र वैक्रान्त वज्राभ्रकान्त पाषाण टङ्कणम् ।
भूनाग: शक्तयश्चैता: षट्कोणे पूजयेत्क्रमात् ।।
गन्धतालककासीसशिलाकङ्कुष्ट भूषणम् ।
राजावर्तो गैरिकञ्च ख्याता उपरसा अमी ।
पूज्या अष्टदलेष्वेते पूर्वादीशानुगङ्क्रमात् ।
रसकं विमला ताप्यं चपला तुत्थमञ्जनम् ।
हिङ्गुलं सस्यकञ्चैव ख्याता एते महारसा: ।। (R.R.S. 6/47-52)

Central Lotus Design

A lotus-like design with eight petals is crafted on the Rasa Mantapa. At its center, mercury is placed within a mortar.

Hexagonal Arrangement

Surrounding the mortar, a hexagonal design is drawn. Starting from the eastern angle, the following items are placed at each corner in sequence: diamond, fluorspar, black mica, magnetite, borax, and earthworm extract.

Petal Center Placement

Within the center of each petal, starting from the eastern direction, are arranged: sulphur, yellow orpiment, green vitriol, realgar, gamboge, galena, lapis lazuli, and ochre.

Petal End Placement

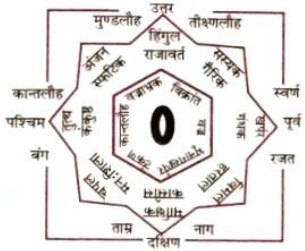
At the ends of the same petals, also starting from the eastern direction, the following are placed: calamine, iron pyrites, copper pyrites, bismuth (or selenium, as some sources suggest), blue vitriol, stibnite, coralline ore, and peacock ore.

Directional Material Placement

- Gold and silver are positioned on the eastern side of the lotus design.
- Copper and lead are placed on the southern side.
- Tin and magnet occupy the western side.
- Pig iron and black iron are set on the northern side.

Ritual Worship

The Rasa Mantapa is worshipped regularly, invoking the blessings of the Siddhas to ensure success and spiritual harmony.



Concept of Rasa-Rasayana

Concept of Rasa

जरारुङ्मृत्युनाशय रस्यते वा रसो मत: । (R.R.S. 1/77)

1. **Rasa and Its Association with Parada**: In Rasashastra, the term Rasa is often associated with Parada (mercury), reflecting its transformative properties. The internal administration of Parada is believed to counteract ageing, eliminate diseases, and even conquer death—objectives central to the concept of Rasayana.
2. **Early Use of Parada in Rasayana**: Historically, Parada was a key component in Rasayana therapies, which aimed to rejuvenate and prolong life. This deep connection between Rasa and Rasayana highlights their intertwined nature.
3. **Modern Applications of *Rasoushadhis***: In contemporary practice, Rasoushadhis (medicinal formulations based on mercury and other minerals) are employed to treat a vast spectrum of curable and incurable diseases. This evolution demonstrates the expanded role of Rasayana in modern therapeutic applications.

Concept of Rasayana

दीर्घमायु: स्मृतिं मेधामारोग्यं तरुणं वय: ।
प्रभावर्णस्वरौदार्यं देहेन्द्रियबलं परम् ।।
वाक्सिद्धिं प्रणतिं कान्तिं लभते ना रसायनात् ।
लाभोपायों हि शस्तानां रसादीनां रसायनम् ।।
(Ch.Chi. 1/1/7-8)

1. **Definition and Purpose**: Rasayana, also known as rejuvenation therapy, aims to halt the ageing process, eradicate illnesses, and enhance the function of the sensory organs.
2. **Origins in Ayurveda**: The concept of Rasayana has been integral to Ayurveda since its inception, with detailed descriptions found in ancient samhitas. Rasayana Tantra is recognized as one of the eight branches (Ashtanga) of Ayurveda.
3. **Evolution of Practices**: Initially, only herbal medicines were utilized for Rasayana. Over time, preparations involving metals and minerals also became prominent in rejuvenation therapies.
4. **Benefits of Rasayanas**
   - **Promote longevity and vitality.**
   - **Enhance memory and sharpen intelligence.**
   - **Restore youthful vigor and slow down the ageing process.**
   - **Protect the body against various diseases.**
   - **Improve complexion, voice quality, and overall excellence.**
   - **Strengthen the body and sensory organs.**
   - **Bestow perfection in speech and appearance.**

Conclusion

Rasayana, a cornerstone of Ayurvedic science, emphasizes rejuvenation and the holistic enhancement of health and longevity. Through the use of Rasayanas, Rasoushadhis, and advanced Rasa preparations like

Khalvi Rasayana and Kupi Pakva Rasayana, ancient practices continue to contribute significantly to both preventive care and therapeutic applications. The inclusion of Parada, along with various metals and minerals possessing Rasayana properties, highlights the profound depth of this tradition. This enduring system reflects Ayurveda's commitment to promoting positive health, combating diseases, and enhancing vitality across time.

Recent development in Ayurvedic Pharmaceuticals

Introduction

1. **Roots in Family Tradition** : Ayurvedic medicine has its origins deeply rooted in familial traditions, where secretive manufacturing practices ensured quality and efficacy. Recipes and methods were passed down through generations, maintaining authenticity and trust.
2. **Historical Milestones:** While Ayurveda has been an integral part of Indian culture for thousands of years, its large-scale industrial development only gained momentum in recent decades. This evolution marked a shift from small, home-based preparation to organized production.
3. **Current Manufacturing Landscape:** Although traditional practitioners still prepare bespoke remedies for individual needs, these methods cannot cater to the rising demand for standardized herbal products. Consumers today seek consistency in dosage and convenient forms, driving a move towards industrial production.
4. **Industry Expansion:** India's Ayurvedic sector now boasts over 9,000 manufacturing units, illustrating the rapid expansion of this ancient science into a modern industry. These units cater to both domestic and international markets, highlighting Ayurveda's global appeal.
5. **Technological Integration:** Modern Ayurvedic manufacturing has evolved beyond traditional methods, incorporating techniques adapted from pharmaceutical, chemical, and food industries. Mechanization ensures precision, scalability, and quality.
6. **Advantages of Modernization:** By embracing technology, manufacturers can enhance product forms, such as transitioning traditional preparations like kashayas into powders, tablets, or capsules. This advancement retains the essence of traditional principles while meeting contemporary demands for convenience and efficiency.
7. **Emerging Trends:** Innovative processes like freeze-drying and vacuum drying are gaining traction in Ayurvedic pharmacies. These methods extend shelf life and improve usability, ensuring ancient remedies remain effective and accessible in modern formats.

Factors Influencing the Development of Ayurvedic Pharmacies

1. **Improving Taste**: A primary goal is to make medicines more enjoyable to consume, thereby enhancing patient compliance.
2. **Dose Reduction**: Efforts are focused on minimizing the quantity of medicine needed for effective treatment.
3. **Sustainable Supply**: Ensuring a continuous and reliable availability of medicinal products remains a crucial objective.
4. **Localized Craftsmanship**: Promoting decentralized production facilitates the preservation of regional traditions and practices.
5. **Innovation in Formulations**: There is a significant emphasis on creating new and diverse formulations to meet varied health needs.

Evolution of Dosage Forms in Ayurvedic Medicine

1. **Commercialization Driving Innovation:** With the rise of Ayurveda's global popularity, large-scale manufacturing has become essential to meet the growing demand. This necessitates the modification of traditional formulations, such as Panchavidha Kashaya Kalpana, to create diverse and scalable dosage forms.
2. **Key Modification Processes:** Transforming primary dosage forms involves several key steps:
   - **Raw Material Preparation**: Drying raw ingredients to ensure quality.
   - **Formulation Techniques**: Heating to achieve the desired consistency, incorporating sweeteners, and enabling fermentation.

   - **Packaging and Storage**: Employing modern containers and preservation techniques to extend shelf life and enhance market appeal.
3. **Purpose of Modifications:** The modifications serve multiple objectives:
   - Enhancing palatability for easier consumption.
   - Prolonging shelf life to meet market standards.
   - Ensuring patient compliance through improved compatibility and dosage accuracy.
   - Increasing global acceptance by aligning with modern preferences.
   - Simplifying dispensing and portability for convenience.
4. **Modernization and New Dosage Forms:** Industrialization has transformed classical Ayurvedic formulations into contemporary forms such as tablets, capsules, and syrups. These innovations are designed to enhance therapeutic efficacy, stability, and ease of use, while maintaining traditional principles.
5. **Recent Trends in Dosage Development:** Modern Ayurvedic formulations now integrate advanced technologies to improve:
   - **Solubility and Bioavailability**: Ensuring better absorption and efficacy.
   - **Pharmacological Activity**: Enhancing the therapeutic potential.
   - **Stability and Safety**: Reducing toxicity while maintaining effectiveness. Innovative oral dosage forms include effervescent granules, rapid-dissolving tablets, and coated capsules. Meanwhile, topical forms such as toothpaste, herbal hair dyes, moisturizers, pain balms, and sprays have also gained popularity.
6. **Blending Tradition with Modernity:** Contemporary Ayurvedic pharmacies are adopting these trends, merging traditional knowledge with modern production methods. By leveraging new machinery, advanced packaging, and preservatives, they cater to evolving consumer preferences.
7. **Emergence of Proprietary Ayurvedic Medicines:** The pharmaceutical industry has seen a surge in Ayurvedic proprietary medicines, where classical remedies are combined into unique branded formulations. These modern Ayurvedic brands, designed to rival Western medicines, have been well-received by society, reflecting a positive shift towards integrative healthcare solutions.

Sr. No.	Classical Preparation	Modern Preparation
1.	Svarasa	Juice, Powder, Syrup
2.	Kalka	Powder, Tablets
3.	Kvatha	Tablets, Distillation, Syrup
4.	Hima/ Phanta	Syrups, Distillation
5.	Ghrita/ Taila	Lipososmes, Ointment, Soft Gelatin Capsules
6.	Avaleha	Grannules.
7.	Lepa	Cream, Ointment, Lotion, Gel

Evolution of Equipments in Ayurvedic Medicine

The field of Ayurvedic pharmacy has significantly evolved and improved over time, becoming more efficient and reliable. The integration of modern equipment such as disintegrators, grinders, pulverizers, mixers, end runners, and edge runners has revolutionized the manufacturing process. Consequently, these advancements have not only enhanced production capabilities but have also replaced many traditional instruments used in ancient practices.

Sr. No.	Classical Equipments	Modren Tecnology
1.	Musha	Crucibles
2.	Puta	Muffle Furnace
3.	Chullika	Gas Stove
4.	Arka Yantra	Distillation Apparatus
5.	Angara Koshti	Steam Cooker
6.	Urukhalva Yantra	Disintegrator
7.	Khalva Yantra	Mixer/ Wet Grinder, End Runner, Edge Runner.
8.	Asava- Arishta Container (Mud pot)	Porcelain Jar, Glass Jar.

Multiple Choice Questions

1. **Which two schools of thought form the foundation of Rasashastra?**
   a. Siddha and Natha Sampradaya
   b. Dakshinatya and Auttarahika Sampradaya
   c. Vedic and Samhita Sampradaya
   d. Sangraha and Modern Sampradaya
2. **Who is considered the divine originator of Rasashastra?**
   a. Lord Brahma b. Sage Agastya
   c. Lord Shiva d. Siddha Nagarjuna
3. **What is the primary focus of the Siddha Sampradaya?**
   a. Spiritual evolution
   b. Metallurgical advancements
   c. Achieving Rasa Siddhi using mercury
   d. Development of Ayurvedic literature
4. **Who among the following is associated with the Natha Sampradaya?**
   a. Agastya b. Tirumular
   c. Adinatha d. Purnakesar
5. **Siddha Nagarjuna is renowned for:**
   a. Establishing the Dakshinatya tradition
   b. Writing Rasendra Mangala and Kaksha-pula Tantra
   c. Sculpting the Nataraja statue
   d. Propagating the teachings of Rasashastra in North India
6. **What significant event led Sage Agastya to South India?**
   a. The formation of the Natha Sampradaya
   b. The divine wedding of Shiva and Parvati causing the earth to tilt
   c. The spread of Siddha tradition
   d. A call to establish Nalanda University
7. **Which period in Rasashastra's evolution is characterized by the composition of foundational texts like Charaka Samhita?**
   a. Vedic Period b. Samhita Period
   c. Sangraha Period d. Modern Period
8. **During which phase did Rasashastra experience a revival influenced by modern chemistry?**
   a. Prehistoric Period
   b. Golden Era
   c. Post-Samhita Period
   d. 19th Century
9. **What was the primary material used in crafting tools and implements during the Indus Valley Civilization?**
   a. Iron b. Gold
   c. Copper and bronze d. Lead
10. **What alchemical material was known for its strength-enhancing properties in ancient civilizations?**
    a. Bitumen b. Cinnabar
    c. Shilajatu d. Gypsum
11. **Which Veda mentions the use of gold and other metals?**
    a. Yajurveda b. Rigveda
    c. Atharvaveda d. Samaveda
12. **What is the term used in Ayurveda for processed metals?**
    a. Dhatu b. Dhatru
    c. Lohadhatu d. Ayaskriti
13. **Which ancient text provides guidelines for identifying metals and gemstones?**
    a. Charaka Samhita
    b. Kautilya's Arthashastra
    c. Sushruta Samhita
    d. Ashtanga Hridaya
14. **What process is described in Ayurveda for the purification of gold?**
    a. Mardana b. Dhmapana
    c. Suvarna Shodhana d. Bhasma Nirmana
15. **Which metal was used by the Ashwinikumaras in prosthetic surgery according to the Rigveda?**
    a. Copper b. Gold
    c. Iron d. Tin
16. **What is the Ayurvedic term for diamond used in the treatment of venomous bites?**
    a. Vajra b. Vaidurya
    c. Manikya d. Pravala
17. **In which Samhita is the use of metals like Vanga (tin) and Tamra (copper) described for Ayaskriti preparations?**
    a. Charaka Samhita b. Sushruta Samhita
    c. Ashtanga Hridaya d. Rigveda
18. **Which mineral was used in Ayurveda for the treatment of skin disorders?**
    a. Kasisa (Green Vitriol)
    b. Shilajatu (Mineral Pitch)
    c. Tuttha (Copper Sulfate)
    d. All of the above
19. **What technique was introduced in Sushruta Samhita for drug processing involving incineration?**
    a. Antardhuma Method
    b. Tuvaraka Puta
    c. Rasayana Karma
    d. Shodhana
20. **Which text describes the internal use of Anjana (collyrium)?**
    a. Ashtanga Hridaya b. Sushruta Samhita
    c. Charaka Samhita d. Kautilya's Arthashastra
21. **Bhaishajya (भेषज) refers to:**
    a. Diet b. Medicine
    c. Surgery d. Yoga
22. **How many categories are there in "Padacatustaya"?**
    a. Two b. Three
    c. Four d. Five
23. **"Kalpana" in Ayurveda primarily refers to:**
    a. Diagnosis of diseases
    b. Processing and preparation of medicines
    c. Maintenance of hygiene
    d. Classification of herbs
24. **Bhaishajya Kalpana is classified under which type of formulations?**
    a. Kashthausadhi b. Rasaushadhi
    c. Both a and b d. None of the above
25. **The term "Svarasa" refers to which type of preparation?**
    a. Decoction b. Fresh juice
    c. Fermented beverage d. Herbal paste
26. **What is the primary focus of the Atreya school of Ayurveda?**
    a. Surgery b. Medicine (Kayachikitsa)
    c. Panchakarma d. Rasaushadhi
27. **Which Ayurvedic classic describes "Panchavidha Kashaya Kalpanas"?**
    a. Sushruta Samhita b. Charaka Samhita
    c. Kashyapa Samhita d. Ashtanga Hridaya
28. **The Veda that primarily mentions medicinal plants is:**
    a. Rigveda b. Yajurveda
    c. Atharvaveda d. Samaveda
29. **What is "Hima Kalpana"?**
    a. Fermented preparation
    b. Cold infusion
    c. Warm decoction
    d. Herbal paste
30. **The Sanskrit term for decoction is:**
    a. Svarasa b. Kalka
    c. Kvatha d. Phanta
31. **Which of the following is a fermented preparation in Ayurveda?**
    a. Churna b. Arishta
    c. Ghrita d. Taila
32. **Which plant is referred to as "Soma" in the Rigveda?**
    a. Ashvagandha b. Ephedra
    c. Guggulu d. Tulasi
33. **What is the primary component of Rasaushadhi formulations?**
    a. Herbal powders b. Metals and minerals
    c. Dairy products d. Essential oils
34. **"Abhisava Kalpana" refers to:**
    a. Decoctions
    b. Fermented preparations
    c. Ghee-based formulations
    d. Herbal pastes
35. **"Avaleha" is best described as:**
    a. Herbal paste
    b. Herbal linctus
    c. Fermented preparation
    d. Decoction
36. **Which classical text focuses on surgical practices in Ayurveda?**
    a. Charaka Samhita b. Sushruta Samhita
    c. Kashyapa Samhita d. Ashtanga Hridaya
37. **The term "Mulini" in Ayurveda refers to:**
    a. Root-based plants b. Flower-based plants
    c. Fruit-based plants d. Leaf-based plants
38. **Which is NOT a Panchavidha Kashaya Kalpana?**
    a. Svarasa b. Kalka
    c. Taila d. Phanta
39. **The school of Dhanvantari specializes in:**
    a. Rasaushadhi
    b. Surgery (Shalyatantra)
    c. Panchakarma
    d. Kayachikitsa

40. The Sanskrit term for "wholesome food intake" as described in Ayurveda is:
a. Ahara b. Rasayana
c. Vihara d. Upavasa

41. What is the ideal location for establishing a Rasashala?
a. In a crowded marketplace
b. In a serene environment free from disturbances
c. Near a factory for easy access to materials
d. On a hilltop with no water access

42. Which direction is considered auspicious for positioning the Rasashala?
a. South b. South-West
c. North-East d. West

43. According to Rasaratna Samuchaya, where should grinding operations (Pashana Karma) be performed in a Rasashala?
a. North-East b. South
c. North-West d. East

44. Which deity is installed in the eastern section of a Rasashala?
a. Lord Shiva b. Rasabhairava
c. Lord Vishnu d. Goddess Lakshmi

45. What is the main role of a drug keeper in the Rasashala?
a. Conduct worship rituals
b. Operate grinding equipment
c. Maintain records of raw materials and finished products
d. Perform metal transmutation

46. What is the shape of the Rasa Linga prepared in the Rasashala?
a. Cuboidal b. Conical
c. Oval-shaped d. Cylindrical

47. What is the significance of the hexagonal arrangement on the Rasa Mantapa?
a. It symbolizes the five elements of nature.
b. It aligns with directions for cosmic energy flow.
c. It is designed for the placement of specific materials like diamond and magnetite.
d. It is used for drying herbs.

48. Which text prescribes the ideal layout of the Rasashala?
a. Charaka Samhita
b. Sushruta Samhita
c. Rasaratna Samuchaya
d. Ashtanga Hridaya

49. What is the purpose of the central platform in the Rasa Mantapa?
a. Grinding metals
b. Worshipping the Rasa Linga
c. Storing medicines
d. Performing washing activities

50. Which materials are placed on the eastern petal of the lotus design in the Rasa Mantapa?
a. Sulphur and yellow orpiment
b. Diamond and magnetite
c. Gold and silver
d. Tin and magnet

51. What is the primary purpose of Rasayana therapy in Ayurveda?
a. Treating acute diseases
b. Enhancing immunity and longevity
c. Relieving pain
d. Increasing weight

52. In Rasashastra, the term "Rasa" is primarily associated with which substance?
a. Gold b. Silver
c. Mercury (Parada) d. Iron

53. What is a key historical milestone in the development of Ayurvedic pharmaceuticals?
a. Introduction of modern packaging
b. Large-scale industrial development in recent decades
c. Discovery of herbal medicines
d. Introduction of synthetic drugs

54. Which of the following is a modern dosage form of Avaleha?
a. Ointment b. Granules
c. Tablets d. Capsules

55. What is the main goal of modifying traditional Ayurvedic formulations for modern use?
a. Reducing therapeutic efficacy
b. Aligning with modern preferences for convenience and compliance
c. Limiting global acceptance
d. Increasing raw material use

56. Which advanced technology is being used to improve the shelf life of Ayurvedic medicines?
a. Vacuum drying
b. Freezing
c. Solar drying
d. Fermentation

57. What is one of the key purposes of technological integration in Ayurvedic pharmacies?
a. Reducing production speed
b. Improving patient compliance
c. Eliminating the use of herbs
d. Avoiding industrialization

58. Which equipment is NOT mentioned as part of modern Ayurvedic manufacturing?
a. End runners b. Pulverizers
c. Disintegrators d. Stethoscope

59. What is a proprietary Ayurvedic medicine?
a. A classical preparation described in Samhitas
b. A unique branded formulation combining classical remedies
c. A synthetic drug
d. A homeopathic preparation

60. What modern dosage form is derived from Hima/Phanta?
a. Tablets b. Syrups and distillates
c. Ointments d. Capsules

Answer Sheet

1.	B.	2.	C.	3.	C.	4.	C.	5.	B.	6.	B.	7.	B.	8.	D.
9.	C.	10.	C.	11.	B.	12.	B.	13.	B.	14.	C.	15.	C.	16.	A.
17.	B.	18.	D.	19.	B.	20.	B.	21.	B.	22.	C.	23.	B.	24.	C.
25.	B.	26.	B.	27.	B.	28.	C.	29.	B.	30.	C.	31.	B.	32.	B.
33.	B.	34.	B.	35.	B.	36.	B.	37.	A.	38.	C.	39.	B.	40.	A.
41.	B.	42.	C.	43.	B.	44.	B.	45.	C.	46.	C.	47.	C.	48.	C.
49.	B.	50.	A.	51.	B.	52.	C.	53.	B.	54.	B.	55.	B.	56.	A.
57.	B.	58.	D.	59.	B.	60.	B.								

Write Short Question Answer

1. Define Rasashastra and Bhaishajya Kalpana.
2. Briefly explain the chronological development of Rasashastra and Bhaishajya Kalpana.
3. What is the significance of Rasashastra in Ayurveda?
4. Explain the scope of Bhaishajya Kalpana in modern pharmaceutical practices.
5. What are Rasashala, Rasa-mandapa, and Bheshajagara?
6. Define the concept of Rasa-Rasayana and its importance in Ayurveda.
7. Discuss the contribution of Indians in preparing metal-based medicines.
8. What are the key components of a Rasa-mandapa?
9. Briefly explain the recent developments in Ayurvedic pharmaceuticals.
10. What is the role of Bheshajagara in Ayurvedic medicine preparation?

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2 Paribhasha (परिभाषा)

• Lecture: 8 hours, non-lecture: 4 hour • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Definition of Paribhasha

अव्यकानुक्तलेशोक्त संदिग्धार्थप्रकाशिका:।
परिभाषा प्रकथ्यन्ते दीपीभूता: सुनिश्चिता:।। (Vai.P.Pra., 1/4)

1. **अव्यक्त (Avyakta)** : Unclear, not well expressed, or vague.
2. **अनुक्त (Anukta)** : Not stated or not mentioned explicitly.
3. **लेशोक्त (Leshokta)** : Partially expressed or mentioned briefly.
4. **संदिग्धार्थ (Sandigdhartha)** : Having doubtful or ambiguous meaning.
5. **प्रकाशिका: (Prakashikaah)** : Those which illuminate or clarify.

Paribhashas are like lamps that illuminate and clarify the meaning of terms or concepts that are unclear, not explicitly stated, partially mentioned, or ambiguous. They are presented to make things clearly understood and well-determined.

निगूढानुक्तलेशोक्त संदिग्धार्थ प्रदीपिका।
सुनिश्चितार्था विबुधै: परिभाषा निगद्यते।। (R.T. 2/2)

1. **Nigudha (Hidden or Concealed)**: Many texts contain meanings that are not immediately obvious.
2. **Anukta (Unmentioned or Unstated)**: At times, important details may be omitted from a text. Paribhashas fill these gaps, providing explanations that complete the concept.
3. **Leshokta (Partially Expressed)**: Texts may only partially convey an idea, leading to confusion or multiple interpretations.
4. **Sandigdhartha (Ambiguous or Doubtful Meaning)**: When a text's meaning is ambiguous, Paribhashas guide readers toward the correct interpretation, eliminating uncertainty.
5. **Pradeepika (Illuminator or Clarifier)**: A Paribhasha acts like a light that makes clear what was previously dark or obscure, aiding comprehension.
6. **Sunishchitartha (Clear or Well-Determined Meaning)**: The ultimate goal of a Paribhasha is to provide clarity, leaving no room for doubt or misinterpretation.
7. **Vibudhaih (By the Wise or Learned Scholars)**: This term emphasizes that the use of Paribhashas is an established practice among learned scholars to maintain clear communication.

Importance of Paribhasha

परिभाषाध्यायमादौ योऽधीते रससाधक:।
रसतन्त्रार्थविज्ञाने न स मुह्यति कुत्रचित्।। (R.T. 2/1)

To become well-versed in Rasa Shastra, one should first become familiar with its terminology. This basic concept will work as umbrella knowledge, it helps to clear the confusion and increase proper understanding.

व्यक्ताऽनुक्ताश्च ये ह्यर्था लीना ये चाप्यनिर्मला:।
लेशोक्ता ये क्वचित्स्युस्तेषां चापि प्रसाधनम्।। (Su.U. 65/4)

According to this, there are many terminologies in Ayurveda whose meanings are not clearly understood. Therefore, to clarify the meanings of these terms, one should rely on the methods of Tantra Yukti (logical and interpretative techniques).

Word Derivation

1. Aushadha (औषध)

Aushadha, meaning medicine or drug, is essential for health preservation and disease treatment. Aushadha can be used single or in combination. The Charaka Samhita lists 152 superior single drugs (agraya prakarana), the Ashtanga Sangraha lists 155, and the Ashtanga Hridaya lists 55. Aushadha is one of four healthcare aspects, along with the physician, attendant, and patient. All substances (dravya) derive from the five mahabhutas (prithvi, apa, agni, vayu, akasha), and the body is a composition of these elements in varying proportions. Imbalance in these proportions disrupts homeostasis, causing disorders. To restore balance, substances with the required mahabhuta composition are administered. Since aushadha is a dravya, it restores homeostasis and treats disease. Effective disease management requires correct identification, dosage, and timing of aushadha administration. Proper selection depends on understanding its mode of action, and to avoid adverse effects, aushadha must be patient-specific, location-specific, and season-specific. Examination of aushadha is crucial prior to use.

औषधिभिर्निव्यन्नं व्याधिहितं तदुपलक्षणा।
त्वात् सर्वं चिकित्सितमौषधं रूढम्।। (Gangadhar)

According to ancient scholars, aushadhi (medicine) is always beneficial (hita) for the patient (rogi). The term aushadhi comes as an upalakshana, where "upa" refers to upasarga (a prefix).

ओषो नाम रस: सोऽस्यां धीयते यन्तदोषधि:।
ओषादरोग्यमाद्यत्ते तस्मदोषधिरोषध:। (Ka.S.)

Aushadha refers to substances that bear osa (also known as rasa), which leads to arogya (health). Therefore, aushadhi and oshadhi are synonymous. Generally, aushadha means preparations made from drugs to cure diseases and promote health.

अल्पस्यापि महार्थत्वं प्रभूतस्याल्पकर्मताम्।
कुर्यात् संयोगविश्लेषकालसंस्कारयुक्तिभि:।। (Ch.K. 12/48)

There is no letter that is not a mantra (incantation), no root that is not a medicine, and no human being who is not useful. Only the yojaka (coordinator) is a rare commodity.

In a broad sense, any substance or mixture of substances intended for internal or external use to preserve and strengthen health, and to prevent or cure disease in humans or animals, is called aushadha.

2. Bheshaja (भेषज)

रोगभयं जयतीति भेषजम्।
भेषं रोगं जयतीति औषधम् इत्यमर:।।(Shabdakalpradruma)
तदेव युक्तं भैषज्यं यदारोग्याय कल्पते। (Ch.Su. 1/134)

"Bheshaja" or "Bhaishajya" refers to substances or treatments that alleviate the fear of disease or restore health by balancing the doshas.

In Ayurveda, the concept of "Padachatushtaya" refers to the four categories of essential elements necessary for the sustenance of life. These categories are Bheshaka (Physician), bheshaja (medicine), Paricharaka (Attendant), and Rogi (Patient). Among these, bheshaja, or medicine, holds a significant position, being essential for the treatment of diseases and the preservation of health.

Prashasta Bhesaja Lakshana

बहुता तत्रा योग्यत्वमनेकविध कल्पना संपच्चेति चतुष्क: अयं द्रव्याणां गुण उच्यते। (Ch.Chi.1/3)
बहुकल्पं बहुगुणं सम्पन्नं योग्यमौषधम्। (A.Hr.Su. 1/28)

Emphasizing bhesaja in Ayurvedic texts like those of Charaka and Vagbhata highlights its importance in maintaining well-being. Bheshaja, is valued for its applicability, quality richness, abundance, and versatility in addressing various health concerns. Hence Bheshaja is kept in second position among the padachatushtaya because of its great role in treatment grounds.

While food is essential for nourishment, medicine plays a vital role in restoring health during imbalances or diseases, emphasizing the significance of using appropriate medicines for overall health and illness management.

3. Kalpana (कल्पना)

Kalpana is orginated from kalpa word:

कृप् सामर्थ्य धातु and **अच् प्रत्यय** = Kalpana
कल्प्यते विधीयते असौ विधि:। (Shabdakalpadruma)

"Kalpana" in Ayurveda refers to the various methods or processes employed in the preparation of pharmaceutical products. These methods are critical to the formulation of medicines and include

a range of techniques such as grinding, heating, frying, and boiling.

Each technique serves a specific purpose, contributing to the efficacy, safety, and preservation of the final product, ensuring that the medicinal properties of the ingredients are maximized and harmonized for therapeutic use.

कल्पनं योजनमित्यर्थः। (Arundatta)

Kalpana refers to the strategic planning and methodology involved in the preparation of Ayurvedic medicines.

कल्पनमुपयोगार्थं प्रकल्पनं संस्करणमिति यावत् स्वरसादिबहुलक्षणम्। (Chakrapani)

Kalpana refers to the processing of substances for consumption in various forms, such as juice and other preparations.

4. Kashaya (कषाय)

Etymology: The root term "Kashaya" comes from the Sanskrit root **कष** (kasha) or **कषति** (kashati) signifies actions like scraping, rubbing, injuring, or killing. (Shabdakalpadruma)

Definition

कण्ठस्य कर्षणात् प्रायो रोगाणां वाऽपि कर्षणात्।
कषायशब्दः प्राधान्यात् सर्वयोगेषु कल्प्यते।।

(Ka.S.Khil. 3/29-30)

कषाय (Kashaya) is described as something that irritates or affects the throat. Within Kashaya Kalpana, this irritation metaphorically represents the action of removing or driving away a disease from the body.

Another interpretation of Kashaya is derived from breaking down the components of the word:

- क (ka) stands for काय (kaya), which means body.
- ष (sha) implies destruction.
- य (ya) denotes यंत्रण (yantrana) or नियंत्रण (niyantrana), meaning control or restraint.

5. Pancha Kashaya Yoni (पञ्च कषाय योनि)

पञ्च कषाययोनय इति मधुरकषायः, अम्लकषायः, कटुकषायः, तिक्तकषायः, कषायकषायश्चेति तन्त्रे संज्ञा। (Ch.Su. 4/6)

कषाययोनयः पञ्च रसा लवणवर्जिताः। (A.Hr.K. 6/8)

Among the Shadrasas (Madhura, Amla, Lavana, Katu, Tikta, Kashaya), drugs with the five rasas other than Lavana are considered sources for preparing Kashaya. This is because Kashaya can be prepared using the Madhura, Amla, Katu, Tikta, and Kashaya rasas. In contrast, Lavana rasa alone cannot be used to prepare Kashaya; it must be combined with the other five rasas to do so.

6. Samskara (संस्कार)

संस्कारो हि गुणान्तराधानमुच्यते। ते गुणास्तोयाग्निसन्निकर्षशीलवमन्थनदेशकालवासनभावनादिभिः कालप्रकर्षभाजनादिभिश्चाधीयन्ते।। (Ch.Vi. 1/22/2)

Aushadha Kalpana involves preparing medicines by applying various processing techniques to crude drugs. This processing transforms the substances, enhancing their pharmacological actions (a process known as samskara). Common processing techniques include dilution, application of heat, cleansing, churning, storing, maturing, flavoring, and preservation in containers.

1. **Jala**: e.g. Panaka, Svarasa, etc.
2. **Agni**: e.g. Bhasma, Masi, Kshara, etc.
3. **Jala**: Agni Sannikarsha- e.g.- Kvatha, Arishta, etc.
4. **Shosha**: e.g. Shodhana karma.
5. **Manthana**: e.g.- Takra Kalpana, Malahara kalpana, etc.
6. **Desha**: e.g.- Himachal- Sheeta Virya, etc.
7. **Kala**: e.g:- Collection of Plant Part (Sharadaritu-Kshira), Kumbha ghrita, etc.
8. **Vasana**: e.g.- Dhupana karma of Asava- Arishta Container, Pushpa kalka patra for sneha Kalpana.
9. **Bhavana**: e.g: - for specific preparation to increase the potency of drug or formulation.
10. **Kala Prakarsha**: Duration length of time.
11. **Bhajana**: Preparation of sandhana kalapana (15-30 days).

Dravya/Varga Paribhasha (Classical Names, English names, Chemical Composition/Formula)

Rasa (रस)

Parada is a central element in Rasa Shastra, often regarded as the "semen" of Lord Shiva, which mythologically descended to earth during the divine union of Shiva and Parvati. This metal is widely used in various formulations, especially in Rasayoga as Bhasma. Initially, Parada was employed in Lohavada and later in Dhatuvada.

Sankriti Name: Parada
Hindi: Para
English: Mercury/Quick Siliver
Latin name: Hydrargirum
Chemical Formula: Hg

Etymology

1. Rasa

रसनात् सर्वधातूनां रस इत्यभिधीयते।
जारणङ्मृत्युनाशाय रस्यते वा रसो मतः।। (R.R.S. 1/77)

Mercury has the ability to encapsulate Abharakadi Rasa dravays. It is believed that Rasa can make the body free from aging and death. Its benefits extend beyond humans to devas, as it helps them overcome all types of evils.

2. Rasendra

रसोपरसराजत्वात् रसेन्द्र इति कीर्तितः। (R.R.S. 1/78)

Mercury is considered the supreme among all metallic and mineral drugs.

3. Suta

देहलोहमयीं सिद्धिं सूते सूतस्ततः स्मृतः।। (R.R.S. 1/78)

Subjected to the eightfold process (Ashtasamskara), mercury can achieve both the perfection of the body (Dehasiddhi) and the perfection of metals (Lohasiddhi).

4. Parada

रोगपङ्काब्धिमग्नानां पारदानाच्च पारदः। (R.R.S. 1/79)

It has ability of curing all the disease if it is used along with other preparation.

5. Mishraka

सर्वधातुगतं तेजोमिश्रितं यत्र तिष्ठति।
तस्मात् स मिश्रकः प्रोक्तो नानारूपफलप्रदः।। (R.R.S. 1/79)
मयूरचन्द्रिकाच्छायः स रसो मिश्रको मतः।
सोऽप्यष्टादशसंस्कारयुक्तश्चातीव सिद्धिदः।। (R.R.S. 1/73)

The various shades of color observed in different varieties of mercury indicate a mixture of different metals. After undergoing the 18 purification processes (Samskara), it gains the ability to bestow all types of siddhis (spiritual powers). Additionally, mercury has the power to dissolve all metals.

Maharasa (महारस)

Maharasa refers to a category of superior minerals and metals renowned for their potent therapeutic properties and significant role in alchemical processes. The term "Maharasa" translates to "great essence," highlighting their profound impact on health, vitality, and longevity.

Acharyas are having different opinion regarding numbers of Maharasa

Maharasa Dravya	R.R.S 2/1	R.Pra.Su. 5/2	Go.Sa. 2/20	Rasaarnava 7/2	R.Hr.Ta 9/4	Ra.Up. 4/4	Ay. Pra. 2/347	R. Pad. 1/38
Parada	–	–	–	–	–	+	+	–
Abharaka	+	+	+	–	–	–	–	+
Vikranta	+	+	+	–	+	+	–	+
Makshika	+	+	+	+	+	+	–	+
Vimala	+	+	+	+	+	+	–	–
Shilajatu	+	+	+	+	+	+	–	+
Sasayaka	+	+	+	+	+	+	–	+
Chapala	+	–	–	+	–	+	–	–
Rasaka	+	+	+	+	–	–	–	+
Rajavarta	–	+	–	–	–	–	–	–
Hingula	–	–	+	+	+	–	–	–
Anjana	–	–	–	+	–	–	–	–
Kantaloha	–	–	–	–	+	–	–	–

अधवैक्रान्तमाक्षीकविमलादिजसस्यकम्।
चपलो रसकश्चेति ज्ञात्वाऽष्टौ सङ्ग्रहेदमान्।। (R.R.S. 2/1)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Abharaka	Mica	$[HK_2](MgFe)_2(AlFe)_2(SiO_4)_2$
2.	Vikranta	Tourmaline or Flurospar	a. Tourmaline- $K_2O\ Al_2O_3.6SiO_2$ b. Flurospar- CaF_2
3.	Makshika	Pyrites	$CuFeS_2$
4.	Vimala	Iron Pyrite	FeS_2
5.	Shilajatu	Mineral Pitch	–
6.	Sasayaka	Peacock ore, Blue Vitriole	$CuSO_4.5H_2O$
7.	Chapala	Bismuth	Bismuth ore
8.	Rasaka	Calamine, Zinc Blende, Zinc Mineral	a. Zinc oxide- ZnO b. Zinc Sulphide- ZnS c. Zinc Carbonate- $ZnCO_3$ d. Zinc Silicate- $ZnSiO_4$

Uparasa (उपरस)

- Uparasa, a group of secondary minerals or inorganic substances used for therapeutic purposes.
- These minerals are considered to have less potency compared to primary minerals, known as Maharasa, which are more powerful and directly utilized in alchemical preparations.
- These drugs used as adjuvants in the processing of Rasa and Maharasa.
- Despite being of lesser potency, Uparasa substances still hold a vital role in various formulations, contributing to the holistic healing practices.

Acharayas are having different opinion regarding numbers of Uparasa

Uparasa Dravya	R.R.S 3/1	R.Hr. Ta 9/5	Rasaarnava 7/56	Ra. Chud. 11/1	Ra.Up. 4/5	R. Pad. 1/55
Gandhaka	+	+	+	+	+	+
Gairika	+	+	+	+	+	–
Kanshi	+	+	+	+	+	–
Haratala	+	+	+	+	+	+
Manashilla	+	+	+	+	+	+
Anjana	+	+	–	–	+	–
Kasisa	+	+	+	+	+	–
Kankushtha	+	+	+	+	–	–
Rajavart	–	–	+	–	–	–
Sauviranjana	–	–	–	+	–	–

गन्धाश्मगैरिकासीस काङ्क्षीतालशिलाञ्जनम्।
कङ्ष्टं चेत्युपरसाश्चाष्टौ पारदकर्मणि।। (R.R.S. 3/1)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Gandhaka	Sulphur	S
2.	Gairika	Haematite, Red Oxide of Iron	Fe_2O_3
3.	Kasisa	Green Vitriol, Ferrous Sulphate	$FeSO_4$
4.	Kanshi	Alum, Potash Alum, Double Sulphate of Aluminum and Potassium.	$K_2SO_4.AL_2(SO_4)_3.24H_2O$
5.	Haratala	Opriment	As_2S_3
6.	Manashilla	Realgar	As_2S_2
7.	Anjana	Collyrium	Sauviranjana- Stibnite (Sb_2S_3) Srotanjana- Antimony Sulphide (Sb_2S_3) Nilanjana- Lead Sulphide (PbS) Pushpanjana- Zinc Oxide (ZnO) Rasanjana- Extract of Indian Barberry
8.	Kankushtha	Gambose tree extract	–

Sadharana Rasa (साधारण रस)

- Sadharana Rasa refers to a group of minerals considered less important than Maharasa and Uparasa.
- This group includes substances derived from animals (pranija), purified materials (shudha), salts (lavana), and mineral drugs (khanija).
- These substances are commonly used in the Parada Samskara process (purification and processing of mercury).
- In ancient times, Sadharana Dravyas were readily available, but controversies around these drugs emerged after the medieval period of Ayurveda.
- Some of the controversial drugs in the Sadharana Rasa category are:

- Kampillaka
- Navasadara
- Vanhijara
- Girisindura

Acharayas are having different opinion regarding numbers of Sadharana Rasa

Sadharana Rasa Dravya	R.R.S	R.Pra. Sud.	Ayu. Pra	Ra. Chud.
Kampillaka	+	–	+	+
Gauripashana	+	–	+	+
Navasadara	+	+	+	+
Karparda	+	+	+	+
Agnijara	+	+	+	+
Girisindura	+	+	+	+
Hingula	+	+	–	+
Mridarashringa	+	+	–	+
Chapala	–	–	+	–

कम्पिल्लश्चापलो गौरीपाषाणो नवसादरः।
कपर्दो वह्निजारश्च गिरिसिन्दूरहिङ्गुलौ।।
मृद्वारशृङ्गमित्यष्टौ साधारणरसाः स्मृताः।। (R.R.S. 3/120–121)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Kampillaka	Indian Kamala, Rottalera, Monkey face tree.	–
2.	Gauripashana	Arsenic oxide, Vitreous arsenic, Arsenolite, White Arsenic	As_2O_3
3.	Navasadara	Ammonium Chloride, Ammonium Salts	NH_4Cl
4.	Karparda	Cowries, Marine Shell, Porcelaneous Shells	Calcium Carbonate ($CaCO_3$)
5.	Mriddarashringa	Litharge	PbO
6.	Agnijara	Amber, Ambergrees	–
7.	Girisindura	Red Oxide of mercury/ Monotroydite	HgO
8.	Hingula	Cinnabar	HgS

Dhatu Varga (धातु)

The term Loha is derived from the Sanskrit word "Luh," which refers to the extraction of metals from ores. The synonym Dhatu is also used for Loha, emphasizing its essential role in maintaining body tissues and supporting overall health and longevity. Properly processed and consumed in their Bhasma (calcined ash) form, these substances have been used therapeutically for thousands of years in Ayurveda.

शुद्धं लोहं कनकरजतं भानुलोहाश्मसारम्।
पूतीलोहं द्वितयमुदितं नागवङ्गाभिधानम्।।
मिश्रं लोहं त्रितयमुदितं पित्तलं कांस्यवर्तम्। (R.R.S. 5/1)

(See table next page top)

Acharayas are having different opinion regarding numbers of Dhatu

Dhatu	Rasarnava 7/97	Rasop. 4/3	Anandakanda 1/9	Sha. Sam. 11/1	Rasapadhati 1/11	R.T. 15/2	Ayu. Pra. 3/1
Svarna	+	+	+	+	+	+	+
Rajata	+	+	+	+	+	+	+
Tamra	+	+	+	+	+	+	+
Tikshna	+	+	+	+	–	–	–
Vanga	+	+	+	+	+	+	+
Naga	+	+	+	+	+	+	+
Abhraka Sattva	–	+	+	–	–	–	–
Loha	–	–	(Kanta, Munda)	–	+	+	+
Yashada	–	–	–	–	–	+	+
Pittala	–	–	+	+	+	–	–
Kansya	–	–	+	–	+	–	–
Varta	–	–	+	–	+	–	–

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Svarna	Gold	Au
2.	Rajata	Silver	Ag
3.	Tamra	Copper	Cu
4.	Lauha	Iron	Fe
5.	Naga	Lead	Pb
6.	Vanga	Tin	Sn
7.	Kansya	Bronze	8 Parts Copper + 2 Parts Tin
8.	Pittala	Brass	2 Parts of Copper + 1 Part of Zinc
9.	Varta	Alloy of five Metals	1 Part each(Kansya + Tamra + Pittala + Loha + Naga)

Upadhatu (उपधातु)

Acharyas are having different opinion regarding numbers of Upadhatu

Upadhatu	Sha. Sa. M. 11/53	Ayu. Pra. 3/4	R. T. (21/1)
Makshika	+	–	+
Tutha	+	+	+
Abharka	+	–	–
Nilanjana	+	–	–
Manashilla	+	–	–
Haratala	+	–	–
Rasaka	+	–	–
Svarnamakshika	–	+	–
Rajata Makshika	–	+	–
Shilajatu	–	+	–
Kansya	–	+	–
Pittala	–	+	–
Sindura	–	+	–
Karpara	–	–	+
Mandura	–	–	+
Nagasindura	–	–	+
Kasisa	–	–	+

माक्षिकं तुत्थकाभ्रे च नीलाञ्जनशिलालकाः।
रसकञ्चेति विज्ञेया एते सप्तोपधातवः॥ (Sha.M.Kh.11/53)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Makshika	Pyrites	$Cu FeS_2$
2.	Tutha	Peacock ore, Blue Vitriole	$CuSO_4 5H_2O$
3.	Abharka	Mica	$[HK_2] (MgFe)_2 (AlFe)_2 (SiO_4)_2$
4.	Nilanjana	Galena/ Lead Sulphide	PbS
5.	Manashilla	Realgar	As_2S_2
6.	Haratala	Opriment	As_2S_3
7.	Rasaka	Calamine, Zinc Blende, Zinc Mineral	a. Zinc oxide- ZnO b. Zinc Sulphide- ZnS c. Zinc Carbonate- $ZnCO_3$ d. Zinc Silicate- $ZnSiO_4$

Ratna (रत्न)

- Ratnas, or precious stones, are rare and valuable gems that are small in size, hard in nature, and possess an inherent beauty derived from their natural origins.
- In Rasa Shastra, Ratnas are defined as stones, rocks, minerals, or materials that improve in quality over time, eventually achieving the status of "Ratnas." These gems are characterized by their unique properties: they are typically sweet (Madhura) and astringent (Tuvara) in taste (Rasa), light and mobile in quality (Sara), and cooling in potency (Shishira in Virya).
- In terms of their actions (Karma), they have a scraping or cleansing effect (Lekhana).
- Ratnas hold great significance in Rasa Shastra for their role in binding mercury (Rasa Bandha) and facilitating the digestion (Jarana) of mercury in the Parada Kechari process, enhancing its therapeutic potency and effectiveness in various alchemical preparations.

Acharyas are having different opinion regarding numbers of Ratna

Ratna	R.R.S 4/5	R.Cu. 12/1	Rasop. 4/9	R.P.Su 7/2	Rasa-padhati 88	An. Ka. 1/9	R.T.23/2
Manikya	+	+	+	+	+	+	+
Mukta	+	+	+	+	+	+	+
Pravala	+	+	–	+	+	–	+
Tarkshya	+	+	–	+	+	+	+
Pushpa	+	+	–	+	+	+	+
Vajra	+	+	+	+	+	+	+
Nilama	+	+	+	+	+	+	+
Gomeda	+	+	+	+	+	+	+
Vaidurya	+	+	+	+	+	+	+
Vaikranta	–	–	+	–	–	–	–

माणिक्यमुक्ताफलविद्रुमाणि तार्क्ष्यञ्च पुष्पं भिदुरञ्च नीलम्।
गोमेदकञ्चाथ विदूरकञ्च क्रमेण रत्नानि नवग्रहाणाम्॥
(R.R.S. 4/5)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Manikya	Ruby	Al_2O_3
2.	Mukta	Pearl	$CaCO_3$
3.	Pravala	Coral	$CaCO_3$
4.	Tarkshya	Emerald	$Be_3Al_2 (SiO_3)_6$
5.	Pushparaga	Topaz	$Al_2O_3SiOF_2$
6.	Vajra	Diamond	C
7.	Nilama	Sapphire	Al_2O_3
8.	Gomeda	Zircon	$ZrSiO_4$
9.	Vaidurya	Cat's Eye	$BeOAl_2O_3$

Uparatna (उपरत्न)

Acharyas are having different opinion regarding numbers of Uparatna

Uparatna	An. Ka. 1/12	Ayu. Pra. 5/8	R. T. 23/ 145
Suryakanta	+	+	+
Chandrakanta	+	+	+
Vaikranta	+	+	–
Rajavarta	+	+	–
Perojika	+	+	–
Sphatika	–	–	+
Tarakanta	+	–	+
Kanta	+	–	+
Sasyaka	+	–	+
Vimala	+	–	+
Lalamani	–	+	+
Muktashukti	–	+	–
Shankha	–	+	–
Karpurashma	–	+	–
Kaacamani	–	+	–
Nilamani	–	+	–
Pitamani	–	+	–
Vishaharamani	–	+	–
Agnistam-bhakamani	–	+	–
Jalastambhakamani	–	+	–

वैक्रान्तं सूर्यकान्तश्च चन्द्रकान्तो नृपोपलः।
पेरोजकञ्च स्फटिकं क्षुद्ररत्नगणोद्यम्॥ (R.T. 23/154)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Vaikranta	Tourmaline	$K_2O Al_2O_3.6SiO_2$
2.	Suryakanta	Sun stone	$Na_2O Al_2O_3 6SiO_2 + CaO Al_2O_3 2SiO_2$
3.	Chandrakanta	Moon Stone	$KAl Si_3O_8$
4.	Rajavarta	Loupis Lazuli	$Na_2 (S_3Al) Al_2 (SiO_4)_3$
5.	Perojaka	Turquoise	$CuAl_6 (PO_4)_4 (OH)_8 4H_2O$
6.	Saphatika	Quartz/Rock Crystal	SiO_2

Sudha Varga (सुधा वर्ग)

The word "Sudha" literally means ambrosia, nectar, flower honey, comfort, water, milk, a good drink, and the beverage of the gods. However, in this context, "Sudha" specifically refers to limestone, which is rich in calcium. The group is named "Sudha Varga" because it includes drugs containing calcium in compound form.

Classical texts, such as Rasarnava and Rasaratnakara, refer to this group as "Shukla Varga":

शुक्लवर्गः सुधाकूर्म्मशङ्खशुक्तिवराटिकाः॥ (Rasav.T. – 5/40)

चुन्न कूर्म शंखशुक्तिवाटः शुक्लवर्गकः ।। (R.R. 2/6)

The Rasamritam text further elaborates on these substances under the heading "Sudha Vijnaneeyam," highlighting their chemical composition.

Acharyas are having different opinion regarding numbers of Sudha Varga

Sudha Varga	Bhaishjya Ratnavali/3	Rasamrita
Shankha	+	+
Shukti	+	+
Sambhuka	+	–
Mrigshringa	+	–
Tankana	+	–
Godanti	+	+
Sudha	–	+
Khatika	–	+
Samudraphena	–	+
Kapardika	–	+
Kurmaprishtha	–	+
Kukkutanda Tvaka	–	+

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Shankha	Conch Shell	$CaCO_3$
2.	Shukti	Oyster	$CaCO_3$
3.	Sambhuka	Pila	$CaCO_3$
4.	Mrigshringa	Stag horn	$Ca_3(PO_4)_2$
5.	Tankana	Borax	$Na_2B_4O_7 \cdot 10H_2O$
6.	Godanti	Gypsum	$CaSO_4 \cdot 2H_2O$

Sikata Varga (सिकता वर्ग)

- Sikata Varga represents a category of silicon-containing compounds known for their alchemical and therapeutic properties.
- Classical Ayurvedic texts do not specifically classify Sikata Varga; instead, references to these drugs are scattered across the literature.
- These compounds are notable for being readily available and cost-effective to formulate.
- Despite their significant therapeutic potential, the clinical use of Sikata Varga is limited due to the lack of official data regarding their efficacy and safety.
- Various methods for binding mercury and internal administration of these compounds have been documented.
- In the 20th century, scholars categorized these compounds under a distinct group known as Sikata Varga.

Acharyas are having different opinion regarding numbers of Sikata Varga

Sikata Varga	Rasamrita	Rasa Darpana	Rasa Bindu	Rasa Tirangini	Ayu. Pra.	Anadakanda
Dugdhapashana	+	+	+	+	–	–
Badarashama	+	+	+	–	–	–
Kauseyashama	+	+	+	–	–	–
Nagapashana	+	+	+	–	–	–
Vyomashama	–	–	–	–	–	–
Sikata	+	–	–	–	+	+
Trinkantamani	–	+	+	–	–	–

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Dugdhapashana	Talc, Soft stone	$MgSiO_3$ (Magnesium Silicate)
2.	Badarashama	Beryl	Silicate of Lime
3.	Kauseyashama	Asbestos	Mg SiO (Silicate of Magnesium)
4.	Nagapashana	Serpemtine, Ophite	–
5.	Vyomashama	Zade, Nephrite	$NaAl(SiO_3)_2$
6.	Sikata	Sand	–
7.	Trinkantamani	Succium	–

Lavana Varga (लवण वर्ग)

Lavana, commonly known as salt, plays a significant role in both culinary practices and medicinal uses. It is an essential dietary element not only for humans but also for animals and many plant species. In Ayurveda, Lavana is one of the six tastes (Shadrasa). Regarding its Panchabhautika composition, Acharya Charaka attributes it to the elements of Jala (water) and Agni (fire), while Acharya Sushruta describes it as a combination of Prithvi (earth) and Agni (fire).

Acharyas are having different opinion regarding numbers of Lavana Varga

Lavana Varga	Charaka, Vagbhata, Bhai. Rat., Ra.Chi., Yog.Rat., Ra.Ka.Dhe., Ana. Ka., Chak.	Shu., Sha, Bha. Pra., Vai. P.P., R.R.S., Gor.Sa., Ra.Sa.San. R.T., R.J.N., Ra. Pur.	Ra.Hr.Tr.	Rasarnava	Ra.Chu.
Saindhava	+	+	+	+	+
Sauvarchala	+	+	+	+	+
Vida	+	+	+	–	+
Samudra	+	+	+	+	+
Audhavida	+	–	–	–	–
Romaka	–	+	+	–	–
Chullika	–	–	+	+	–
Kancha	–	–	–	+	+

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Saindhava	Rock Salt	NaCl Na_2S $NaHCO_3$
2.	Sauvarchala	Sochal Salt	NaCl Na_2S Fe
3.	Vida	Ammonium Salt	NaCl Na_2S
4.	Samudra	Sea Salt	NaCl Na_2S
5.	Audhavida	Reha Salt	NaCl $NaHCO_3$
6.	Romaka	Lack Salt	NaCl $NaHCO_3$ Na_2S

Visha (विष)

दृष्टवैतद् यद्विषीदन्ति जनास्तस्माद्विषं मतम्।
नरं वा विविणीत्येतन्मृत्युपाशैस्ततो विषम्।। (R.T. 24/1)

The term "Visha" is derived from the words "Vishada," meaning misery, or "Vishinatya," meaning suffering. Visha can be defined as a substance that brings about a life of misery simply by its presence or even by merely being seen.

Visha	Rasarnava 5/33	R.Cu. 9/11	R.R.S. 10/82	R.T. 24/8	B.P. (dhatvadi 191)	Ayu. Pra. 6/12
Kalakuta	+	+	+	+	+	+
Shringika	+	+	+	+	+	+
Saktuka	+	+	+	+	+	+
Vatsanabha	–	+	+	+	+	+
Pita	–	+	+	–	–	–
Halahala	–	–	–	+	+	+
Pradeepna	–	–	–	+	+	+
Haridra	–	–	–	+	+	+
Brahmaputra	–	–	–	+	+	+
Sourashtrika	–	–	–	+	+	+
Krishna Visha	+	–	–	–	–	–
Sitamusta	+	–	–	–	–	–

हालाहलः कालकूटः शृङ्गकश्च प्रदीपनः।
सौराष्ट्रिको ब्रह्मपुत्रो हारिद्रः सक्तुकस्तथा।।
वत्सनाभ इति ज्ञेया विषभेदा अमी नवा।
रसे रसायनादौ च वत्सनाभः प्रशस्यते।।
विषाणां सक्तुकान्तानां प्रयोगो नेह दृश्यते।
अतस्त्वेषां विषाणां तु स्वरूपं न प्रदर्शितम्।। (R.T. 24/7-9)

1. Halahala
2. Kalakuta
3. Shringika
4. Pradeepna
5. Sourashtrika
6. Brahmaputra
7. Haridra
8. Saktuka
9. Vatsanabha

English name: Monk's hood, Wolf's bane, Indian Napellus, Helmet Flower.

Chemical composition: Aconitine, Pseudoaconitine, Benzaconine, Hypaconitine.

Upavisha (उपविष)

Upavisha	R.T.	Ayu. Pra.	R.R.S.
Snuhi Kshira	+	–	–
Arka Kshira	+	+	+
Dhatura	+	+	+
Karavira	+	+	+
Languli	+	+	+
Kuchala	+	+	+
Bhanga	+	+	+
Gunja	+	+	–
Ahiphena	+	+	–
Jayaphala	+	–	–
Bhallataka	+	–	+

विषति-दुक बीजं च त्वहिफेनञ्च रेचनम्।
धत्तूरबीजं विजया गुञ्जा भल्लातकाह्वय:॥
अर्कक्षीरं स्नुहीक्षीर लाङ्गली करवीरकम्।
समाख्यातो गणोऽयं तु बुधैरुपविषाभिध:॥ (R.T. 24/163-64)

Sr. No.	Dravya Name	English Name	Chemical Formula
1.	Kuchala	Poison Nut Tree, Quaker buttons, Nux vomica, Semen strychnos	Strychnine, brucine, loganin, and other indole alkaloids.
2.	Ahiphena	Opium, Opium poppy, White poppy, Opium poppy capsule	Morphine, codeine, thebaine, papaverine, and noscapine.
3.	Jayaphala	Purging croton, Croton Seeds	Myristicin, elemicin, safrole, eugenol, and volatile oils.
4.	Dhatura Bija	Thorne Apple, Angel's trumpets	Atropine, scopolamine, hyoscyamine, and other tropane alkaloids.
5.	Bhanga	Indian Hemp	Delta-9-tetrahydrocannabinol (THC), cannabidiol (CBD), and other cannabinoids.
6.	Gunja	Crab's eye, Wild Liquorice, Paternoster pea, Weather plant, Rosary pea.	Abrin (a toxic protein), abric acid, glycyrrhizin, and flavonoids.
7.	Bhallataka	Marking nut	Bhilawanol, phenolic compounds, and semecarpol.
8.	Arka Ksheera	Latex of Calotropis gigantia	Calotropin, calotropagenin, and other cardiac glycosides.
9.	Snuhi Ksheera	Latex of Euphorbia nerifolia	Euphol, taraxerol, and diterpenes.
10.	Langali	Glory Lily	Colchicine, gloriosine, and other alkaloids.
11.	Karavira	Indian oleander or Nerium	Oleandrin, nerline, and other cardiac glycosides.

Kajjali (कज्जली)

धातुभिर्गन्धकाद्यैश्च निर्द्रवैर्मर्दितो रस: सुश्लक्ष्ण: कज्जलाभोऽसौ कज्जलीत्यभिधीयते॥ (R.R.S. 8/5)

When purified mercury is triturated with other purified metals, sulfur, and various drugs, without adding any liquids, until the mixture attains a smooth, fine texture and appears black like collyrium, it is known as Kajjali.

निर्द्रवैर्धातुभिश्चाथ गन्धकादिभि: पेषित: पारद: श्लक्ष्णतां प्रापित:। कज्जलाभो यदा जायतेऽसौ तदा नामत: कोविदै: कज्जली-त्युच्यते॥ (R.T. 2/27)

Parada (Mercury) is finely ground and triturated with purified metals (Dhatus) and other substances like Gandhaka Dravya without using any liquids (Nirdravaih). The process continues until the mixture reaches a very smooth, fine consistency (Shlakshnata).

When this mixture achieves a black, collyrium-like appearance (Kajjalabha), it is known as Kajjali.

English name: Black Sulfide of Mercury, Black Ash

Chemical Composition: Mercuric Sulfide (HgS).

Mitrpanchaka (मित्रपंचक)

आज्यं गुञ्जाथ सौभाग्यं क्षौद्रं च पुरसंज्ञकम्।
एतत्तु मिलितं विज्ञैर्मित्रपञ्चकमुच्यते॥
विविधानां तु लोहानां द्रावणाय विशेषत:।
रसतन्त्रविशेषज्ञैर्युज्यते मित्रपञ्चकम्॥ (R.T. 2/37-38)

Sr. No.	Dravya Name	English Name	Chemical Composition
1.	Ajya	Ghee	Fatty Acid
2.	Gunja	Rosary Pea/ Jequirity	Abrine, Arridin
3.	Tankana	Borax	$Na_2B_4O_7 \cdot 10H_2O$
4.	Kshaudra	Honey	Fructose, Glucose, Sucrose, maltose

Sr. No.	Dravya Name	English Name	Chemical Composition
5.	Guggulu	Indian Bedellium	Guggulsterones, Myrrhanol, Myrrhanone, Limonene, Glucuronic acid

Application

1. Apunarbhava Pariksha on Bhasma
2. Sattvapatana Process

Dravaka Gana (द्रावक गण)

गुञ्जा मधु गुड: सर्पि: सौभाग्यं गुग्गुलुस्तथा।
पूर्वाचार्यै: कीर्तितोऽयं धातूनां द्रावको गण:॥ (R.T. 2/35)

Sr. No.	Dravya Name	English Name	Chemical Composition
1.	Ajya	Ghee	Fatty Acid
2.	Gunja	Rosary Pea/ Jequirity	Abrine, Arridin
3.	Tankana	Borax	$Na_2B_4O_7 \cdot 10H_2O$
4.	Kshaudra	Honey	Fructose, Glucose, Sucrose, maltose
5.	Guggulu	Indian Bedellium	Guggulsterones, Myrrhanol, Myrrhanone, Limonene, Glucuronic acid
6.	Guda	Jaggery	Sucrose

Appication

1. Melting the metals at lower temperature.
2. Sattvapatana Process.

Sandigdha (Controversial)

Vaikranta (वैक्रांत)

Historical Mentions and Controversy

Vaikranta, originally termed "Vaikrantaka dhatu" in the ancient text "Kautilya Arthashastra" (4th century BCE), is also mentioned in subsequent works like the "Rasa Hridaya Tantra." In these texts, Vaikranta is grouped either under "Maharasa" (major minerals) or "Uparatna" (secondary gems). Its precise identification is still a matter of scholarly debate, with four possible modern equivalents suggested: tourmaline, fluorspar, feldspar, and rock crystal.

Characteristics of Possible Vaikranta Minerals

- **Tourmaline**: A borosilicate mineral that exhibits a range of colors, such as black, blue, and red. It has a hardness similar to that of Vajra (diamond), making it a plausible candidate for Vaikranta as described in Rasa Shastra texts.
- **Fluorspar (Fluorite, CaF_2)**: Notably softer than Vajra, with a hardness of 4.0. Fluorspar comes in various colors, including white, green, and purple.
- **Rock Crystal (SiO_2)**: A pure quartz variant with a hardness of 7, comparable to tourmaline. Rock crystal can appear clear, pink, yellow, and in other colors.

Ayurvedic Perspective on Vaikranta

In Ayurveda, Vaikranta is identified as a form of manganese oxide, called "Krishnapashana." The "Rasa Hridaya Tantra" describes its essence (Sattva) as being akin to iron (Loha). There is also a distinct version referred to as "Rasavaikranta," which suggests a divergence from other categories. The Sattva of Vaikranta is thought to resemble cast iron, potentially containing manganese.

Vaikranta in Kautilya's Arthashastra

The "Kautilya Arthashastra" classifies Vaikranta as a metal. According to Yadavaji Trikamji, the term "Vajra" within this context signifies a hard iron (Tikshna Lauha). Vaikranta is suggested as a viable alternative when Tikshna Lauha is not available.

Chapala (चपल)

Background

Chapala, a substance mentioned in the Ashta group of Maharasa in Rasashastra, is the focus of considerable debate due to its ambiguous identification and rarity. Scholars in Rasashastra hold differing opinions regarding the true identity of Chapala. While some suggest it is Bismuth (Bi), others argue that it should be identified as Selenium (Se).

Criteria for Identification

The Maharasa group primarily consists of substances that are minerals or metal ores. Based on this categorization, some scholars contend that Chapala must also be a mineral or metal ore, thereby excluding both Selenium and Bismuth as possible candidates.

Arguments for Bismuth as Chapala

Bismuth possesses several qualities that align with traditional descriptions of Chapala. It is known

for its fusibility, heaviness, and bright appearance. However, its primary application in treating digestive issues does not align well with the traditional uses attributed to Chapala.

Arguments for Selenium as Chapala

Selenium is a versatile metal that exists in multiple amorphous forms and is commonly found as an admixture with minerals such as Chalcopyrite. It is primarily used in the treatment of sexual disorders and is known for its potent antioxidant properties. Due to its varied forms and therapeutic uses, some scholars argue that Selenium more closely aligns with the characteristics and applications of Chapala.

Rasanjana (रसाञ्जन)

Old Classifications and Interpretations

For so long, Rasanjana has been regarded as a contentious substance in Ayurveda. Rasanjana is classified in ancient texts under two headings, one of which is Shailaja, meaning mineral; hence, it originates from hills or mines. Prof. D.A. Kulkarni referred to it as yellow oxide of mercury, found in very small quantity in nature (explained here under the classification).

Modern Practices and Preparations

In modern-day Ayurvedic treatments, however, a synthetic form of Rasanjana has replaced this. The first type gets readied through the process of "Ghanakriya," which includes focused decoction (Kvatha) of Darvi (Berberis aristata), joined with goat milk (Aja Dugdha). Although the modern-day preparation of Rasanjana is slightly different, its usage for eye diseases (Netra Rogas) has been since our ancient times.

Pushpanjana (पुष्पाञ्जन)

The identity of this mineral is debatable; some authors suggest it was a white zinc oxide (similar to Pushpanjana) and used for the diseases of eyes. Others alternatively say it is antimony oxide (Sb_2O_3).

Vahnijara (वह्निजार)

Agnijara, a substance traditionally associated with the seashore, is believed to be the Jaraayu (membrane) of the sea creature Agninakra. Its earliest mention is in the ancient text Rasarnava, but there are numerous interpretations regarding its actual nature:

1. **Chorionic Origin** : Some theories propose that Agnijara is derived from the chorion, or outer membrane, of the Agninakra fish.
2. **Uterine Expulsion of Shark** : Another viewpoint suggests that it represents the uterine discharge of a shark, which, after being washed ashore by waves, dries in the sun.
3. **Medicinal Tree**: Agnijara could also refer to a tree located near the western seashore. This tree has several varieties—Amongrakta (red), Pita (yellow), Shveta (white), and Krishna (black)—with the red variety being noted for its medicinal properties.
4. **Biliary Secretion of Sperm Whale**: A more modern interpretation is that Agnijara is a biliary secretion from the intestines of a sperm whale. This waxy, solid, flammable substance, dull grey or black, is often discovered floating in the sea or on the coast.
5. **Intestinal Part of Whale**: Another theory describes Agnijara as a decaying part of a whale's intestine, caused by an obstruction from ingesting sea grasses. The whale dies, and the decayed intestine eventually floats to the surface.
6. **Hardened Stool of Whale** : Some sources suggest that Agnijara is formed when a whale dies due to a blockage from hardened stool. This stool is later expelled, floats on seawater, and dries in the sun to become a substance akin to amber.
7. **Intestinal Stone of Whale Shark**: Lastly, Agnijara may also be an intestinal stone from a whale shark. This stone causes the whale shark's death and is subsequently expelled, drying on the sea's surface.

Girisindura (गिरिसिंदूर)

According to the Rasa Ratna Samuchchaya

Girisindhura is described as a substance associated with "Rasa" (mercury) or as a compound derived from it. It is found in small quantities in mountainous regions, characterized by its red color and dry appearance. Montroydite, a mineral ore of mercury, shares a similar description, containing traces of free mercury and appearing red in hue.

Description of Girisindhura in Rasatarangini

The "Rasatarangini" provides a detailed description of Girisindhura, stating it to be a fine, slimy, heavy

powder with a red, smooth, and clear texture. Both "Rasatarangini" and "Rasamrita" identify Girisindhura as a compound of lead, which can be synthetically prepared from lead.

Market Preparation of Sindura

Commercially available Sindura is typically produced from lead peroxide. The process involves heating litharge (lead oxide) to around 450°C in the presence of oxygen, resulting in a red coloration on the surface, known as Nagasindura.

Kankushtha (कंकुष्ठ)

Kankushtha has long been a topic of debate, with various interpretations and descriptions provided by different ancient sources:

1. **Ore of Tin (Cassiterite)**: Bhaluki identifies Kankushtha as an ore of tin metal, specifically cassiterite.
2. **Resemblance to Coral (Vidruma)**: According to the Rasarnava, an authoritative text, Kankushtha is described as a bright red substance similar to Vidruma (coral).
3. **Himalayan Origin**: The Rasaratna Samuchchaya claims that Kankushtha can be found at the base of high peaks in the Himalayan Mountains.
4. **Faecal Matter of a Newborn Elephant**: Some scholars believe Kankushtha could be the fecal matter of a newborn elephant calf, characterized by a yellowish-black hue.
5. **Part of the Umbilicus of a Newborn Horse**: Other interpretations suggest it may be part of the umbilical cord of a newborn horse foal, noted for its yellowish-white color.

Anupalabdha (अनुपलब्धता) (Not Available)

Rasaka (रसक)

In contemporary practice, Rasaka—the ore mineral traditionally used for Yashada (zinc)—has largely fallen out of use. This is primarily due to the complexities involved in selecting the appropriate drug. Classical Ayurvedic texts describe three distinct varieties of Rasaka, but in present times, it has become challenging to match the available sources with the descriptions provided by the ancient Acharyas.

Sauviranjana (सौवीराञ्जन)

Anjana is considered one of the most effective treatments in Ayurvedic medicine, often described as a type of stone (shila) obtained from natural sources. Different classical texts offer varying perspectives on the types of Anjana.

Types of Anjana According to Classical Texts

1. **Rasaratna Samuchchaya** : Types Mentioned: Sauvira, Rasanjana, Pusha, Nila, and Srotanjana.
2. **Ayurveda Prakasha**

   स्रोतोञ्जनं तु द्विविधं श्वेतकृष्णविभेदतः।
   तत्र स्रोतोञ्जनं कृष्णं सौवीरं श्वेतमीरितम्।। (A.Pr. 2/226)

   - **Types Highlighted**: Shveta Sauviranjana and Krishna Srotanjana.
   - **Description**: Sheta Sauviranjana is characterized by its white color, while Krishna Srotanjana has a different appearance. Both are compounds of antimony, indicating their related nature.
3. **Rasa Tarangini**
   - **Types Explained**: Srotanjana and Sauviranjana.

Characteristics of Sauviranjan

- Has a smoky appearance on the outside (dhumabha).
- Appears shiny internally.
- Produces a black color when rubbed (mashi varna).

Therapeutic Uses

Sauviranjana is utilized for treating various conditions, including raktapita (bleeding disorders), visha (toxicity), hikka (hiccups), akshiroga (eye diseases), as well as for vrana shodhana (wound cleansing) and ropana (wound healing).

Antimony Ore

The primary ore of antimony, Stibnite (Sb_2S_3), is also white, consistent with the color properties of Sauviranjana.

Kritrima (कृत्रिम) (Artificial)

Sasyaka (सस्यक)

Blue vitriol, also known as copper(II) sulfate or cupric sulfate ($CuSO_4$), is a blue crystalline compound commonly used in various industrial applications, agriculture, and chemical research.

To prepare artificial blue vitriol, copper metal or a copper-containing compound is reacted with sulfuric acid. To prepare blue vitriol [copper(II) sulfate or cupric sulfate], follow these steps:

Materials Needed

1. Copper metal (copper wires or sheets) or copper oxide (CuO).
2. Concentrated sulfuric acid (H_2SO_4).
3. Distilled water.
4. Heat source (Bunsen burner or hot plate).
5. Glass beaker and stirring rod.

Preparation Process

1. Dissolution of Copper

- Place a small amount of copper in a glass beaker.
- Carefully add concentrated sulfuric acid in a fume hood or well-ventilated area.
- Heat the mixture gently to initiate the reaction, which is slow at room temperature but faster with heat.
- The reaction between copper and sulfuric acid produces copper sulfate, sulfur dioxide gas, and water:

$Cu(s) + 2H_2SO_4(aq) CuSO_4(aq) + 2H_2O(1) + SO_2(g)$

2. Filtration

- After the reaction, filter the solution to remove unreacted copper.
- If using copper oxide, the reaction is more straightforward, producing copper sulfate and water:

$Cu(s) + H_2SO_4(aq) CuSO_4(aq) + 2H_2O(1)$

3. Crystallization

- Let the copper sulfate solution cool slowly. Blue copper sulfate crystals will begin to form.
- To aid crystallization, place the solution in a cool area or add a "seed" crystal of copper sulfate.

4. Drying

- Once crystals form, filter them out.
- Dry the crystals in an oven at a low temperature or air-dry them.

Safety Precautions

- Wear protective gloves, goggles, and a lab coat.
- Conduct the experiment in a fume hood or ventilated area to avoid inhaling sulfur dioxide.
- Handle sulfuric acid with care as it is highly corrosive.

Gandhaka (गंधक)

Gandhaka, or sulfur, is commonly prepared and purified for use in various applications, including traditional medicine. Detailed overview of how sulfur can be extracted or synthesized artificially:

1. Extraction from Natural Sources

Sulfur is often obtained from natural deposits or sulfide ores through mining and purification processes:

- **Sulfur Mining**
  - **Extraction**: Sulfur is extracted from natural deposits, such as volcanic areas or salt domes.
  - **Purification**: The extracted sulfur is purified using techniques like sublimation (heating until it vaporizes and then cooling to condense) or flotation.
- **Sulfur Mining Process**

1. **Heating**: Natural sulfur deposits are heated, which can involve burning to produce sulfur dioxide (SO_2).
2. **Condensation**: The sulfur dioxide is cooled to condense it back into elemental sulfur.
3. **Purification**: The elemental sulfur is further purified and processed into different forms, such as powder or granules.

2. Chemical Synthesis

Sulfur can also be synthesized through chemical reactions, primarily from hydrogen sulfide (H_2S) or sulfide ores:

- **From Hydrogen Sulfide (H_2S)**

1. **Reaction with Oxygen**: Hydrogen sulfide gas reacts with oxygen to form sulfur dioxide:
   $2H_2S + 3O_2 \rightarrow 2SO_2 + 2H_2O$
2. **Conversion to Sulfur**: Sulfur dioxide is then reduced using hydrogen or other reducing agents to produce elemental sulfur.

- **From Sulfide Ores**

1. **Roasting**: Sulfide ores, such as pyrite (FeS_2), are roasted in air to convert sulfides into sulfur dioxide:
   $4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$
2. **Sulfur Recovery**: The sulfur dioxide produced is processed further to recover elemental sulfur.

3. Purification and Processing

- **Sublimation**: Sulfur is purified by sublimation, where it is heated to form a vapor and then condensed back into solid sulfur.
- **Grinding**: The purified sulfur is ground into a fine powder for various applications.

Safety Considerations

- **Handling**: Use caution when handling sulfur and its compounds, as they can irritate the skin, eyes, and respiratory system.
- **Ventilation**: Ensure adequate ventilation to avoid inhaling sulfur fumes or dust.

Kasisa (कसीस)

Kasisa, also known as green vitriol or iron(II) sulfate ($FeSO_4$), is a green crystalline compound with various applications. It can be prepared using different methods:

1. Preparation from Iron Sulfide

This method involves the oxidation of iron sulfide.

- **Reaction with Air and Sulfuric Acid**

1. Oxidation of Iron Sulfide

- Iron sulfide (FeS) is oxidized in the presence of air and water to produce iron(II) sulfate and sulfuric acid:

$2FeS + 3O_2 + 2H_2O \rightarrow 2FeSO_4 + 2H_2SO_4$

2. Purification

- The resulting solution is filtered to remove insoluble impurities.
- Iron(II) sulfate is crystallized by cooling or evaporating the solution.

3. Crystallization

- The solution is evaporated slowly to allow iron(II) sulfate crystals to form.
- The crystals are collected by filtration and dried.

2. Preparation from Iron and Sulfuric Acid

This method uses a direct reaction between iron and sulfuric acid.

- **Reaction Process**

1. Reaction of Iron with Sulfuric Acid

- Iron metal reacts with dilute sulfuric acid to produce iron (II) sulfate and hydrogen gas:

$Fe + H_2SO_4 \rightarrow FeSO_4 + H_2$

2. Purification

- The resulting solution is filtered to remove unreacted iron or impurities.
- To prevent oxidation of iron (II) sulfate to iron (III) sulfate (which is not green), the solution is kept in a reducing environment or treated with a reducing agent if necessary.

3. Crystallization

- The filtered solution is allowed to evaporate slowly, forming green vitriol crystals.
- The crystals are collected and dried.

Safety Considerations

- **Handling**: Always wear protective gear, including gloves and safety goggles, when handling sulfuric acid and iron compounds.
- **Ventilation**: Perform reactions involving sulfuric acid in a well-ventilated area or fume hood to avoid inhaling fumes.

Uses

- **Water Treatment**: Used as a coagulant and flocculant in water treatment processes.
- **Reducing Agent**: Acts as a reducing agent in various chemical reactions.
- **Agriculture**: Used as a soil conditioner to correct iron deficiencies in plants.
- **Ink Manufacturing**: A key ingredient in the production of iron gall ink.
- **Dietary Supplement**: Used to treat iron deficiency anemia.

Rasanjana (रसाञ्जन)

In modern-day Ayurvedic treatments, however, a synthetic form of Rasanjana has replaced this. The first type gets readied through the process of "Ghanakriya," which includes focused decoction (Kvatha) of Darvi (Berberis aristata), joined with goat milk (Aja Dugdha). Although the modern-day preparation of Rasanjana is slightly different, its usage for eye diseases (Netra Rogas) has been since our ancient times.

Hingula (हिंगुल)

Hingula, or cinnabar (mercury sulfide, HgS), is a red crystalline compound traditionally used in various applications, including Ayurvedic medicine.

Preparation of Cinnabar (Mercury Sulfide, HgS)

- **Materials Needed**
  - Mercury (Hg) or mercury(II) chloride ($HgCl_2$)
  - Sulfur (S) or hydrogen sulfide (H_2S)
  - Distilled water
  - Heat source (like a Bunsen burner or hot plate)
  - Glassware (beaker, funnel, and filtration setup)

Methods

1. **Using Sulfur and Mercury**
   - **Combine**: Place mercury in a glass beaker and add a stoichiometric amount of sulfur.
   - **React**: Gently heat the mixture to initiate the reaction. Mercury reacts with sulfur to form mercury sulfide (HgS), which precipitates as red cinnabar.
   - **Filter and Wash**: Separate the cinnabar precipitate using filtration, and wash thoroughly with distilled water to remove any impurities.
   - **Dry**: Allow the filtered cinnabar to dry completely in a safe environment.
2. **Using Hydrogen Sulfide**
   - **Prepare Solution**: Dissolve mercury(II) chloride ($HgCl_2$) in distilled water to create a clear solution.
   - **React**: Bubble hydrogen sulfide (H_2S) gas through the solution. This will result in the formation of red cinnabar (HgS) as a precipitate.
   - **Filter and Wash**: Collect the cinnabar precipitate by filtration, wash with distilled water to remove soluble impurities, and then dry.

Safety Precautions

- **Mercury Handling**: Mercury and its compounds are toxic. Always use protective gloves, safety goggles, and a lab coat. Work in a well-ventilated area or fume hood to avoid inhaling mercury vapor.
- **Hydrogen Sulfide**: H_2S gas is highly toxic and has a characteristic rotten egg smell. Handle it carefully in a fume hood to prevent inhalation.
- **General Precautions**: Ensure proper waste disposal according to local regulations for mercury-containing materials.

Pratinidhi (प्रतिनिधि) (Substitute)

The concept of "Pratinidhi Dravya," or substitute drugs, is employed when the original medicinal substance, or "Dravya," is unavailable or difficult to source. These substitutes are selected for their comparable therapeutic properties, actions, and efficacy, although they may not have the same physical traits or botanical identity. This practice, rooted in classical, is essential for maintaining the effectiveness and continuity of treatments.

Some Examples of Commonly used Substitute Drugs

- **Shatavari (Asparagus racemosus) for Ashwagandha (Withania somnifera):** Shatavari serves as a substitute for Ashwagandha due to its rejuvenating properties and ability to enhance vitality and strength.
- **Mustaka (Cyperus rotundus) for Daruharidra (Berberis aristata):** Mustaka can substitute Daruharidra, particularly for its anti-inflammatory and digestive properties, useful in treating fever and gastrointestinal disorders.
- **Guggulu (Commiphora mukul) for Shilajita:** Guggulu is used in place of Shilajita for its similar anti-inflammatory, analgesic, and rejuvenating qualities.
- **Punarnava (Boerhaavia diffusa) for Gokshura (Tribulus terrestris):** Punarnava can replace Gokshura, especially in urinary and renal disorders, due to its diuretic and anti-inflammatory properties.
- **Nagakesara (Mesua ferrea) for Yashtimadhu (Glycyrrhiza glabra):** Nagakesara can be used when Yashtimadhu is unavailable, particularly for treating respiratory conditions and promoting digestive health.

Importance of Using Substitute Drugs

1. **Availability**: Substitutes allow treatments to continue in cases where specific herbs are unavailable due to seasonal or geographical constraints.
2. **Sustainability**: Using substitutes helps conserve endangered medicinal plants by preventing over-harvesting of rare species.
3. **Cost-Effectiveness**: Substitute drugs are often more affordable, making treatments accessible to a wider population.

4. **Continuity of Treatment**: Substitutes ensure that therapeutic regimens are not disrupted in emergencies or in remote areas where original drugs are unavailable.

Vajrabhava – Vaikranta

Both Vajra and Vaikranta are classified as Rasayana, Vrishya, and Mahaushadi, and are known for their ability to balance the three doshas. Vaikranta possesses all the qualities of Vajra, including its properties as Netrya (beneficial for the eyes), Balya (promoting strength), and Varnya (improving complexion).

Rationality for Using Vaikranta as a Substitute for Vajra

1. Accessibility and Cost
   - **Practicality**: Vaikranta is more readily available than the costly Vajra.
   - **Cost-Effectiveness**: Vaikranta reduces formulation costs, making treatments more affordable.
2. Safety and Purity
   - **Controlled Preparation**: Vaikranta is prepared under controlled conditions, ensuring purity and reducing risks.
   - **Reduced Risk**: It minimizes potential side effects compared to natural Vajra.
3. Functional Similarity
   - **Comparable Properties**: Vaikranta mirrors Vajra's transformative and purifying effects.
   - **Consistency**: Offers consistent quality and characteristics.

In summary, Vaikranta serves as a practical, safe, and effective substitute for Vajra, supporting Ayurvedic principles while ensuring treatment efficacy.

Suvarana–Suvarna Makshika

Svarna (gold) and Suvarna Makshika (a type of mineral, also known as "copper pyrite" or "copper iron sulfate") both share several qualities in Ayurveda, such as Madhura Rasa (sweet taste), Rasayana (rejuvenative properties), Vrishya (aphrodisiac), Ayushya (promotes longevity), and Sarva Roga Nashana (curative for all diseases).

Rationality

- **Therapeutic Potential**: Both Svarna and Suvarna Makshika are used in Ayurveda for their potent therapeutic properties. Their inclusion in Rasayana formulations reflects their role in enhancing health and well-being on multiple levels.
- **Bioavailability**: The specific processing techniques used for these substances ensure that they are in a form that the body can effectively utilize. For example, Svarna Bhasma (gold ash) is used in a highly purified and processed form to maximize its benefits and reduce toxicity.

In summary, the properties of Svarna and Suvarna Makshika lies in their traditional use and preparation methods that enhance their therapeutic potential. They are both valued for their ability to support overall health and well-being in various ways.

Prakriya Paribhasha

A. Shodhana (शोधन)

Introduction

In Ayurveda, Shodhana is in practice since the times of Charaka Samhita, but its use expanded with the development of Rasashastra since 8th century CE.

In Charaka Samhita Vimana sthana 1st chapter-while explaining Samskara in the context of Ashtaaharavidhi vishesha ayatana (Rules & Regulations regarding intake of food) in karana (shaucha), we could see only a brief description on Shodhana.

Shodhana possess different meanings in Ayurveda.

- Shodhana (**शोधन**):—A pharmaceutical process of Purification/Detoxification/Refining / imparting useful properties in the materials.

Etomology

- Shodhana = Shudha + lyut (Shabdakalpam)
- Shudha = Shaucha (clean)

Definition

उद्दिष्टैर्गौषधैः मार्द्दं क्रियते पेषणादिकम्।
मलविच्छिनये यत्तु शोधनं तदिहोच्यते॥ (R.T. 2/52)

When a substance is subjected to trituration and other processes with specific plant or animal products to remove unwanted properties, it is referred to as Shodhana.

निर्दिष्टैरौषधैः स्यार्द्धं पेषणं स्वेदनादिकम्।
दुष्ट दोषविनाशाय शोधनं परिकीर्तितम्॥ (Ra.Mr.-1)

The process of treating a substance with specified materials through methods such as rubbing or steaming to remove undesirable properties is known as Shodhana.

Aim

1. Most of the raw material used in Rasashastra are obtained from the earth. So there is every chance of impurities, toxicity and unwanted qualities to large extent.
2. So, purpose of Shodhana is to remove unwanted part from the drug, which control the unwanted effect or toxic effect (if any in the drug) or remove those effects and enhances the properties of drug which make the drug suitable for desired action.

Uses

1. To neutralize toxicity of substance.
2. To Induce & Enhance therapeutic qualities.
3. To remove unwanted substance.
4. To facilitate further process like Marana, Sattvapatana, Lohitikarana, etc.
5. To make material homogenous.
6. Get rid of visible or invisible impurities.
7. remove harmful chemical and physical blemishes.
8. Decreasing Hardness of the substance.
9. To make Metals and Minerals suitable for administration.

Types of Shodhana

Samanya Shodhana

The common impuries which found in all the elements of one varga and removal of them through same procedure is called as samanya shodhana.

Eg. - Dhatu Samanya Shodhana.

तैले तक्रे गवां मूत्रे ह्यारनाले कुलत्थजे।
क्रमान्निषेचयेत्तप्तं द्रावे द्रावे तु सप्तधा॥
स्वर्णादिलोहपत्राणां शुद्धिरेषा प्रशस्यते॥ (R.R.S. 5/13)

Vishesha Shodhana

Uncommon impurities which varies from substance to substance. Such uncommon impurities are peculiar to the substance, therefore special procedure and techniques are used for the removal of these impurities. This is called Vishesha Shodhana.

E.g.- Abhraka Shodhana.

प्रतप्तं सप्तवाराणि निक्षिप्तं काञ्जिकेऽभ्रकम्।
निर्दोषं जायते नूनं प्रक्षिप्तं वाऽपि गोजले॥
त्रिफलाक्वाथिते चापि गवां दुग्धे विशेषतः। (R.R.S. 2/16)

Different Techniques used for Shodhana Purpose

Sr. No.	Shodhana	Purpose	Example
1.	Swedana	Vaporizations of raw dugs in certain liquid materials Reduction of Toxicity, Removal of impurities and to soften	Haratala Shodhana - Haratala in Kushmana svarasa.
2.	Mardana	Trituration with Svarasa, Kashaya, Godugdha, Gomutra - Particle size of drug becomes synergistic additives which causes an agonistic effect	Jambira Svarasa used to triturate tamra patra.
3.	Dhalana	Melting solid raw drug and dipping in cold liquid. Separation of adulterants & reducing brittleness	Gandhaka Shodhana- Gandhaka in Godugdha
4.	Nirvapa	Heating solid drug & dipping into cold liquid -To brittleness & softness	Abhraka Shodhana - Abhraka in Triphala kvatha
5.	Nirjaleekarana	Evaporation of water molecules	Kankshi Shodhana
6.	Nimajjana	Keeping raw drug in certain liquid for certain time. Brings down the toxicity and Removal of outer covering	Vatsanabha Shodhana- vatsanabha in godugdha - Gomutra
7.	Bhavana	Reduction of particle size and also transfer of impurities from material to liquid media	Sasyaka Shodhana
8.	Bharjana	Fry / to dehydrate - Removal of Moisture content	Gairika Shodhana

B. Marana (मारण)

Definition

शोधितान् लोहधात्वादी विमर्द्य स्वरसादिभिः।
अग्निसंयोगतो भस्मीकरणं मारणं स्मृतम्॥
(Ra.Sha., C.B.Jha, p. 73)

Marana is a process that involves the incineration or calcination of metals, minerals, or other substances to transform them into fine powders, known as Bhasmas. This process enhances the medicinal qualities, increases bioavailability, and ensures the safety and effectiveness of the final product for therapeutic use.

Importance of Marana

1. **Reduction in Particle Size** : The Marana method greatly diminishes the particle size of a substance, converting it into a fine powder or "Bhasma." The finer particles offer a larger surface area, which enhances the absorption and assimilation of the drug within the body.
2. **Enhanced Potency and Quality** : Marana increases the drug's potency and quality by transforming raw substances into a more bioavailable state through incineration. This process boosts their therapeutic properties and eliminates impurities, making the substances safer for internal use.
3. **Better Absorption and Assimilation**: By reducing particle size and converting the substance into a bioavailable form, the Marana process improves the drug's absorption and assimilation. The fine particles can easily penetrate tissues, delivering therapeutic benefits more effectively.
4. **Improved Therapeutic Properties** : The Marana process enhances the overall therapeutic value of the drug, ensuring that the active components are more potent and concentrated, leading to greater efficacy in treating various health conditions.
5. **Safety and Purification**: Marana acts as a purification technique, eliminating toxic substances and converting harmful elements into beneficial forms. This detoxification ensures the final product is safe for consumption without causing side effects.
6. **Extended Stability and Shelf-Life** : Marana improves the stability and longevity of substances. The calcination process prevents degradation or oxidation, preserving the medicinal properties of the drugs over an extended period.

Types of Marana

- **Agnipaka Method**: The Agnipaka method is a specialized technique in the Marana process, used to prepare Bhasmas (fine medicinal powders) by applying controlled heat:
  - **Application of Heat**: The technique involves incinerating or calcining substances using a heating apparatus. Heat can be applied in two ways:
  - **Direct Heat**: Substances are exposed to an open flame or direct fire.
  - **Indirect Heat**: Substances are placed in a closed chamber or vessel, where heat is distributed evenly around them without direct contact with the flame.
  - **Controlled Heating Process**: The temperature and duration of heating are carefully monitored to ensure that the substances are transformed into their most effective and safe form.
  - **Purification and Enhancement**: The Agnipaka method aids in purifying substances, removing toxic components, and enhancing their potency, bioavailability, and therapeutic properties.
  - **Ensuring Safety and Efficacy**: This method guarantees that the final product, the Bhasma, is stable, safe for consumption, and highly effective for therapeutic use in Ayurvedic medicine.

Putapaka Method

- Puta refers to the specific amount of heat required for the incineration of Rasa (metals and minerals) and other medicines.
- This heat must be carefully controlled to ensure it is neither too low nor too high.
- Proper heat levels allow the substances to become absorbable and assimilable by the body, enhancing their effectiveness as medicine.
- The distribution of heat can vary based on the number of Sharava Samputas (vessels) placed in a single pit.

- For consistent results in the preparation of Bhasma, it is ideal to use one Sharava Samputa per pit to maintain even heat distribution.
  e.g - Godanti Bhasma, Abhraka Bhasma, etc.

Kupipakva Method

- The Kupipakva method is a formulation technique where specific medicinal substances (dravyas) are carefully combined and subjected to a precise heat treatment within a designated glass bottle.
- This process involves applying a controlled and specific pattern of heat to each substance, following a predetermined sequence and duration, to create a unique formulation.
- The method is known for its meticulous approach, ensuring that the heat application aligns with the properties of the substances and the therapeutic goals of the preparation.
  Eg.- Rasa Sindura, Malla Sindura, etc.

Bhanupaka Method

- Bhanupaka is derived from the Sanskrit words "Bhanu," meaning "sun," and "Paka," meaning "cooking."
- It refers to the method of preparing a formulation by exposing it to sunlight until the preparation is complete.
- e.g.- Lauha Bhasma is specifically prepared using the Bhanupaka method, where the formulation is subjected to the sun's rays to achieve the desired medicinal properties.

Svanga Shita (स्वाङ्गशीत)

वह्निस्थमेव शीतं यत्तदुक्तं स्वाङ्गशीतलम्।
अग्नेराकृष्य शीतं यत्तद्बहिःशीतमुच्यते ।। (R.R.S. 8/58)

Svangashita is a process where the vessel, or Samputa, is left undisturbed within the fireplace to cool down at its own natural pace, without any external interference. This method relies solely on the ambient temperature of the fireplace, allowing the cooling process to occur gradually within its confines.

Bahirshita refers to a technique where the Samputa is taken out of the fireplace and placed in an open environment to cool down naturally. This approach allows the vessel to cool on its own, outside the heated surroundings of the fireplace, by coming into contact with the ambient air.

C. Amritikarana & Lohitikarana

Amritikarana (अमृतीकरण)

लोहादीनां मृतानां वै शिष्टदोषापनुत्तये।
क्रियते यस्तु संस्कार अमृतीकरणं मतम् ।। (R.T. 2/58)

Amritikarana is a vital pharmaceutical process (samskara) in Ayurveda aimed at eliminating any residual impurities or toxic effects (doshas) present in Mrita Loha (incinerated metals, also known as Bhasmas). This process enhances the therapeutic properties, safety, and efficacy of the metals, making them suitable for medicinal use.

Amritikarana ensures that any remaining undesirable qualities are neutralized, transforming the incinerated metals into a more potent and safe form, thereby maximizing their healing benefits.

E.g.- Abharaka amritikarana

Lohitikarana (लोहितीकरण)

Definition

Lohitikarana is a specialized pharm-aceutical process used to impart a red color to Bhasma (calcined powders of metals or minerals). This procedure is not commonly applied to all types of Bhasmas but is selectively used when the desired red coloration is not achieved through the standard Bhasmikarana (incineration) process.

Application

Lohitikarana is specifically referenced in the preparation of Abhraka Bhasma (calcined mica). If the final product does not exhibit the proper red hue, Lohitikarana is employed to produce the correct color. Achieving the appropriate red shade is crucial as it serves as an important indicator of the Bhasma's quality, potency, and effectiveness in Ayurvedic medicine.

D. Sattvapatana, Shuddhavarta, Bijavarta

Sattvapatana (सत्त्वपातन)

"Sattvapatana" is derived from two Sanskrit words: "Sattva" meaning essence, and "Patana" meaning separation. It refers to the process of extracting the active principle or essence from ores or minerals, effectively reducing them to their original metallic form.

Definition

क्षारगन्धलवैर्युक्तं ध्मानमाकरकोष्ठके।
यन्नतो निर्गतः सारः सत्त्वमित्यभिधीयते ।। (R.R.S. 8.34)

The process of sattva extraction from any of the dhatu dravya through various pharmaceutical procedure is called sattvapatana.

Classification

According to form

1. Dhaturupa - e.g.- Sasyaka
2. Adhaturupa - e.g. Manashilla, Haratala

According to origin

1. Herbal - e.g.- Amrita
2. Animal - e.g.- Bhunaga
3. Mineral -e.g.- Abhraka, Vaikranta

General Method of preparation

1. Prepare fine powders of all the required drugs.
2. Place the powders in a Khalva Yantra and add the Dravaka Gana Dravya, Guda, and Amala.
3. Shape the mixture into boluses and place them in a Musha.
4. Heat the Musha using a Koshthi Yantra.
5. Monitor the process until the flame turns white or exhibits a specific color, indicating the completion of the Shuddhavarta process.
6. Remove the Musha and invert it into a container to cool and solidify.

Shuddhavarta (शुद्धावर्त)

यदा तु ज्वलनो ज्वालाकुलः शुक्लसमुत्थितः।
सत्त्वनिर्गमकालः स शुद्धावर्त इति स्मृतः ।। (R.T. 2.41)

When a purified metal or mineral is placed in a crucible and subjected to intense heat in an oven (bhatti) for the purpose of extracting 'sattva,' the flames will turn white at a specific stage. This white flame, known as 'suddhavarta,' signifies that the sattva is being collected separately.

Sr. No.	Dravyas	Shuddhavarta Lakshana
1	Svarna	Yellow Fumes
2	Rajata	White Fumes
3	Tamra	Blueish Fumes
4	Tikshana Lauha	Black Fumes
5.	Naga	Black Fumes
6.	Shilajita	Grey Fumes
7.	Loha	Reddish Black Fumes
8.	Sasyaka	Red Fumes

Beejavarta (बीजावर्त)

दाव्यदव्यनिभा ज्वाला दृश्यते ध्मने यदा।
दावम्योन्मुखता सेयं बीजावर्तः स उच्यते ।। (R.R.S. 8/57)

When a metal or mineral is placed in a crucible and exposed to intense heat in an oven (bhatti) with the aim of melting it, the colors of the melting substance are reflected in the flames at a specific stage. This phenomenon, known as 'Bijavarta,' signifies that the metal or mineral has reached its melting point.

E. Druti (द्रुति)

Druti is a crucial pharmaceutical process in Rasa Shastra that transforms metals, minerals, or gems into a permanent and stable liquid form. This process ensures that the liquid maintains a molten state indefinitely, with the desired characteristics.

Definition

औषधाध्मानयोगेन लोहधात्वादिकं तथा।
सन्निष्ठते द्रवाकारं सा द्रुतिः परिकीर्तिता ।। (R.R.S. 8/81)

Lohadhi Dhatu and other minerals remain in a molten state after being processed with specific herbs and subjected to intense heat. This specialized treatment involves a combination of carefully selected herbs and precise heating techniques that enable the minerals to maintain their liquid form.

Classification

1. **Depend upon their use:**
   - In Mercurial processes.
   - In treatment of disease.
2. **Depend upon on the method of preparation:**
   - Garbhadruti
   - Bahyadruti

Druti Lakshana

निर्लेपत्वं द्रुतत्वं च तेजस्त्वं लघुता तथा।
असंयोगश्च सूतेन पञ्चधा द्रुतिलक्षणम् ।। (R.R.S. 8/82)

1. Non- Sticking
2. Liquefied State.

3. Lustrous
4. Lighter than original weight.
5. Readily mix with mercury.

F. Parada Samskara (पारद संस्कार)

Definition

- **The term Parada Ashtasamskara is derived from three Sanskrit words**: Parada, Ashta, and Samskara.
- **Parada**: Refers to Rasa or mercury.
- **Asta**: Represents the numeric value 8.
- **Samskara**: Means procedure or purification process.

Thus, Parada Ashtasamskara refers to the eight purification procedures required to detoxify and prepare mercury for pharmaceutical and therapeutic purposes in Ayurveda.

Aim

संस्काररुद्ध बलतेजसोऽभिवर्द्धनम्।। (Dhanva.S.)

The process of Samskara enhances the potency of mercury, making it suitable for all types of pharmaceutical and therapeutic applications.

Importance

इत्थंहि सूतसंस्काराः यथा दृष्टे रसायने ।
कार्यांशने प्रथमं शेषां भोक्ता दृष्योपयोगिनः। (R.R.S.11/58)

- The eight Samskaras of mercury are crucial for ensuring its safe and effective use in Ayurveda, especially in Rasayana therapy.
- These purification processes must be performed before any use of mercury.
- Other substances may not require such purification, underscoring the unique requirements of mercury processing in Ayurvedic practice.

Ashtasamskara

स्वेदनं मर्दनं चैव मूर्च्छनोत्थापने तथा।
पातनं बोधनं चैव नियामनमतः परम्।।
दीपनं चेति संस्काराः सूतस्याष्टौ प्रकीर्तिताः। (R.Sa.San.1/50)

1. Svedana
2. Mardana
3. Murchhana
4. Utthapana
5. Patana
6. Bodhana
7. Niyamana
8. Dipana

स्वेदनमर्दनमूर्च्छनोत्थापनपातननिरोधनियमाश्च।
दीपनगगनग्रासप्रमाणमथ चारणविधानं च।।
गर्भदुतिबाह्यदुतिजारणरसरागसारणं चैव।
कामणवेधौ भक्षणमष्टादशधेति रसकर्म। (R.Hr.T. 2/1,2)

1. Svedana
2. Mardana
3. Murchhana
4. Utthapana
5. Patana
6. Nirodhana
7. Niyamana
8. Dipana
9. Grasamana
10. Charana
11. Grabhadruti
12. Bhayadruti
13. Jarana
14. Rajana
15. Sarana
16. Kramana
17. Vedakarma
18. Bhakshana

Svedana Karma

Definition

क्षाराम्लैरौषधैर्वाऽप दोलायन्त्रे स्थितस्य हि।
पाचनं स्वेदनाख्यं स्यात् मलशैथिल्यकारकम्।। (R.R.S. 8/62)

In Svedana, Parada (mercury) and other ingredients are heated in alkaline or acidic liquid media (a circulated medium or vehicle for the drug through which it gets precipitated upon reaching saturation point under normal conditions) with a specialized apparatus called Dola Yantra.

Objective

1. Mala Shaithilya Karana: It helps soften and promote the elimination of impurities or doshas (Mala or Dosha) present in the substances.

Reference

आसुरिपटुकटुत्रयचित्राद्रकमूलकैः कलांशैश्च।
सूतस्य काञ्जिकेन त्रिदिनं मृदुवह्निना स्वेदः।। (R.Hr.T. 2/3)

Ingridents

Sr. No.	Drug Name	Quantity
1.	Shuddha Parada	1 Part
2.	Kanji	Q.S.
3.	Rajika	1/16th Part
4.	Saindhava Lavana	1/16th Part
5.	Shunthi	1/16th Part
6.	Maricha	1/16th Part
7.	Pippali	1/16th Part
8.	Chitraka	1/16th Part
9.	Adraka	1/16th Part
10.	Mulaka	1/16th Part

Procedure

1. Prepare a bolus using the specified ingredients.
2. Place Parada inside the bolus.
3. Cover the bolus with banana leaves.
4. Prepare another bolus and cover it with four-folded cotton cloth.
5. Create a Pottali (a small pouch or bag) and place it into the Dola Yantra (a traditional heating device) filled with Kanji (a fermented rice water or gruel).
6. Expose the setup to mild heat for 3 days.

Precautions

- Refill Kanji in the Dola Yantra regularly to maintain the proper environment.
- Ensure that the Pottali does not touch the bottom of the Yantra.
- While it is generally suggested to replace the Kalka (medicinal paste) daily, it is not essential for a 3-day Svedana. However, for a 21-day Svedana aimed at Lohasiddhi (metallic preparation), reinforcing the Kalka daily is necessary.

Mardana Karma

Definition

उदितैरौषधैः सार्धं सर्वाम्लैः काञ्जिकैरपि।
पेषणं मर्दनाख्यं स्याद्बह्निर्मलविनाशनम्।। (R.R.S. 8/60)

Mardana Karma is a process in which mercury is finely ground or triturated with specified drugs and Kanji (fermented liquid) for a designated period. This process helps in refining and enhancing the therapeutic properties of mercury.

Objective

Bahir-Mal-Vinashanam refers to the process of removing external impurities or contaminants.

Reference

गुडदग्धोर्णालवणैर्मन्दिरधूमेष्टकामुरीमहितैः।
रमषोऽशाशमनैः मकाञ्जिकैर्मर्दनं त्रिदिनम्।। (R.Hr.T. 2/4)

Ingredients

Sr. No.	Drug Name	Quantity
1	Svedana Samskarita Parada	1 Part
2	Kanji	Q.S.
3	Guda	1/16th Part
4	Dagdha Urna	1/16th Part
5	Saindhava Lavana	1/16th Part
6.	Grehadhuma	1/16th Part
7.	Ishtika Churna	1/16th Part
8.	Rajika	1/16th Part

Procedure

1. **Gathering the Ingredients:** Guda (Jaggery) Powder, Dagdhorna (Burnt Cotton), Saindhava Lavana (Rock Salt), Griha-dhuma (Incense Smoke Residue), Istika Churna (Brick Powder), Rajika (Asuri Mushtard Seeds).
2. Combine each of the fine powders in a Khalva Yantra (a traditional grinding tool).
3. Use 1/16th part of Mercury (Parada) for each ingredient.
4. Triturate the mixture with Svedita Parada (sweated mercury) continuously for 3 days, working 8 hours per day.
5. After the third day of triturating, carefully wash the mercury with warm water to remove any residual impurities.
6. Filter the resulting mixture through a clean cloth to separate any solids.
7. Collect the purified mercury from the Kalka.

Precaution

- During the grinding process, make sure to add Kanjika (a fermented liquid) at regular intervals. This helps to enhance the purification and grinding efficiency.
- After the triturating process, filter the mixture using a four-folded cloth. This is important because the Ishtika Churna (brick powder) has a tendency to settle with the mercury, and using a thicker cloth ensures more effective separation of impurities.

Murchchhana Samskara

Definition

मर्दनाऽऽदिष्टभैषज्यैर्नष्टपिष्टत्वकारकम्।
तन्मूर्च्छनं हि बङ्गाहिभुजकञ्चुकनाशनम्।। (R.R.S. 8/61)

Murchchhana Samskara is a purification technique in which Parada (mercury) is processed by triturating it with specific herbal, minerals, and other substances to eliminate its toxic properties. This procedure continues until the mercury reaches the "Nashta Pishta" stage, characterized by a smooth, dough-like consistency.

The process detoxifies the mercury and enhances its therapeutic potential, making it safe and effective for use in various Ayurvedic formulations.

Objective

Vangadi-Bhuja-Kankanashanam: The process detoxifies the mercury and enhances its therapeutic potential, making it safe and effective for use in various Ayurvedic formulations.

Reference

विधिवत् सूतकं दृष्ट्वा सप्तवाराणि मूर्च्छयेत्।
इत्थं सम्मूर्च्छितः सूतो दोषशून्यः प्रजायते॥ (R.R.S. 11/32)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Mardana Samskarita Parada	1 Part
2.	Kanji	Q.S.
3.	Chitraka	1/16th Part
4.	Haritaki	1/16th Part
5.	Amalaki	1/16th Part
6.	Bibhitaki	1/16th Part
7.	Kumari	1/16th Part

Procedure

1. Take the desired quantity of Mardita parada (triturated mercury).
2. Prepare Ghritakumari (Aloe vera), triphala (a blend of three fruits), and chitraka (Plumbago zeylanica), each in a quantity equal to 1/16th of the mercury.
3. Place the mardita parada in a clean khalva yantra (mortar and pestle).
4. Triturate the mercury with Ghritakumari to remove the mala dosha (impurity).
5. Subject the mercury to 7 rounds of bhavana (impregnation and trituration) using Ghritakumari.
6. After each bhavana, wash the mercury thoroughly with kanji (fermented rice water).
7. Repeat the above steps with triphala for another 7 bhavanas to alleviate the vahni dosha (digestive fire-related impurity).
8. Perform 7 bhavanas with Chitraka to remove the visha dosha (toxic impurities).
   After each bhavana, wash the mercury again with kanji.
9. Continue the process until the mercury attains a smooth, paste-like (kalka/pishta) form, indicating the removal of all doshas (impurities).

Uthhapana Samskara

Definition

स्वेदातपादियोगेन स्वरूपापादनं हि यत्।
तदुत्थापनमित्युक्तं मूर्च्छाव्यापत्तिनाशनम्॥ (R.R.S. 8/62)

Utthapana Samskara is a process in which mercury is restored to its original form through various methods, such as Svedana (steaming), Prakshalana (washing), Patana (sublimation), or Atapa (sun exposure).

Objective

Murchchha Vyaapati Nashana

Reference

अमुना विरेचनेन हि सुविशुद्धो नागबङ्गापरिमुक्तः।
सूतः पातनयन्त्रे समुत्थितः काञ्जिकक्वाथात्॥ (R.Hr.T. 2/7)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Murchchhita Parada	1 Part
2.	Ushnodaka	Q.S.
3.	Kanji	Q.S.

Procedure

1. Take the desired quantity of murchchhita parada (purified mercury) that is free from Naga (impurities) and Vanga (vitiation) doshas.
2. Place the mercury in a Patana yantra (distillation apparatus).
3. Subject the mercury to Patana (distillation) to purify and refine it further.
4. Add the mercury to Ushna kanji (hot fermented rice water).
5. Stir the mixture thoroughly to ensure proper mixing and treatment.
6. Cook the mercury with kanji (fermented rice water) for a specified duration.
7. Ensure that the cooking process is conducted at a controlled temperature and for an adequate period.
8. After the chosen method is complete, collect the processed mercury.
9. The collected mercury is now termed utthapita parada and can be used for further procedure.

Patana Samskara

Definition

उत्तौषधैर्मर्दितपारदस्य यन्त्रस्थितस्योर्ध्वमधश्च तिर्यक्।
निर्यातनं पातनसंज्ञमुक्तं वङ्गाहिसम्पर्कजकञ्चुकघ्नम्॥
(R.R.S. 8/64)

The process involves triturating parada (mercury) with specified drugs and then subjecting it to sublimation in a patana yantra (distillation apparatus). The sublimation is carried out in various directions – upper, lower, or transverse to refine and purify the mercury.

Objective

The process removes or eliminates contaminants and toxic substances associated with lead (Vanga), as well as other related harmful impurities.

Reference

कृत्वा तु शुल्बपिष्टिं निपात्यते नागबङ्गशङ्कातः।
तस्मिन्दोषान्भुक्त्वा निपतति शुद्धस्तथा सूतः॥ (R.Hr.T. 2/8)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Utthapana Samskarita Parada	2 Parts
2.	Shuddha Tamra Churna	1 Part
3.	Saindhava Lavana	1/20 Part
4.	Lemon Juice	Q.S.

Procedure

1. Take one part of Utthita Parada (mercury obtained after Utthapana Samskara).
2. Add 1/4th part of Shuddha Tamra Churna (pure copper powder).
3. Incorporate a desired quantity of Jambira nimbu rasa (lemon juice) to the mixture.
4. Place the mercury, copper powder, and lemon juice in a clean khalva yantra (mortar and pestle).
5. Triturate the mixture until it achieves a homogeneous kalka form.
6. Transfer the kalka into the lower pot of the Urddhva-Patana Yantra (sublimation apparatus).
7. Subject the mixture to intense heat for one day.
8. Allow the mixture to cool down overnight.
9. The next morning, carefully unseal the pots.
10. The mercury, now deposited in droplet form at the base of the upper pot, should be carefully scraped off.
11. Collect the scraped mercury, filter it, and store it as Urddhva Patita Parada.
12. The resulting Urddhva Patita Parada will be free from all types of dosas (impurities).

Rodhana Samskara

Definition

जलसैधवयुक्तस्य रसस्य दिवसत्रयम्।
स्थितिरास्थापनी कुम्भे याऽसौ रोधनमुच्यते॥ (R.R.S. 8/65)

The process involves placing parada (mercury) in sainddhava jala (saline water) within a kumbha (pot) or kacha kupi (earthen vessel) for three days in an undisturbed location.

Objective

It increase the mobility of parade and to make more active.

Reference

मर्दनमूर्च्छनपातैः कदर्थितो भवति मन्दवीर्यत्वात्।
सृष्टश्चाम्बुजैर्निरोधात्लब्धाप्यायो न षण्ढः स्यात्॥ (R.Hr.T. 2/16)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Patita Parada	1 Part
2.	Saindhava Jala	Q.S.

Procedure

1. Place the 'pottali' of patita parada (refined mercury) in a required quantity of saline water.
2. Leave the mercury in the saline water for three days.
3. On the fourth day, collect the mercury from the saline water.
4. Wash the collected mercury with warm water.
5. Store the washed mercury properly.

Niyamana Samskara

Definition

रोधनाल्लब्धवीर्यस्य चपलत्वनिवृत्तये।
क्रियते पारदे स्वेदः प्रोक्तं नियमनं हि तत्॥ (R.R.S. 8/69)

It is a process that regulates the mobility of Rodhanan Samskrita Parada.

Objective

Revive its swift-moving property.

Reference

इति लब्धवीर्यः सम्यक् चपलोऽसौ संनियम्यते तदनु।
फणिलशुनाम्बुजमार्कवककोंटीचिञ्चकास्वेदात्।। (R.Hr.T. 2/17)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Bodhana Samskarita Parada	1 Part
2.	Kanji	Q.S.
3.	Tambula Patra	1/16th Part
4.	Lashuna	1/16th Part
5.	Bhringaraja	1/16th Part
6.	Vandhya Karkoti	1/16th Part
7.	Chincha	1/16th Part

Procedure

1. Take fine powders (kalka) of the following substances, each in a quantity equal to 1/16th of the mercury- Lashuna (Garlic), Saindhava lavana (Rock salt), Markava (Bhringaraja), Karkoti (Cucumis melo), Chincha (Tamarind).
2. Combine these powders in a khalva yantra (grinding vessel) and triturate them with the required quantity of kanji to prepare a fine kalka.
3. Apply the prepared kalka thickly onto a cloth.
4. Place the appropriate quantity of bodhita parada on the cloth.
5. Fold the cloth and tie it to form a pottali.
6. Hang the pottali in a dolayantra (a special apparatus) containing kanji as the liquid medium.
7. Carefully place the dolayantra over a mild fire.
8. Boil the mixture for three days, with each day's boiling session lasting 8 hours, over moderate heat.
9. Refill the dolayantra with fresh kanji daily.

Dipana Samskara

Definition

धातुपाषाणमूलाद्यैः संयुक्तो घटमध्यगः।
ग्रासार्थं त्रिदिनं स्वेदो दीपनं तन्मतं बुधैः।। (R.R.S. 8/67)

Dipana Samskara is a purification process where parada (mercury) is boiled with specific stones and plant materials in an earthen vessel for three days to enhance its potency and therapeutic efficacy.

Objective

To enhance the appetite and potency of the mercury.

Reference

भूखगटङ्कणमरिचैर्लवणासुरिशिग्रुकाङ्किकैस्त्रिदिनम्।
स्वेदेन दीपितोऽसौ ग्रासार्थी जायते सूतः।। (R.Hr.T. 2/11)

Ingredients

Sr. No.	Drug Name	Quantity
1.	Niyamana Samskarita Parada	1 Part
2.	Kanji	Q.S.
3.	Shuddha Sphatika	1/16th part
4.	Shuddha Kasisa	1/16th Part
5.	Shuddha Tankana	1/16th Part
6.	Maricha	1/16th Part
7.	Saindhava Lavana	1/16th Part
8.	Rajika	1/16th Part
9.	Shigru Tvaka	1/16th Part

Procedure

1. Take fine powders (kalka) of the following substances, each in a quantity equal to 1/16th of the mercury– Bhunaga, Tankana, Marica, Saindhava lavana, Rajika (Asuri, Mustard seeds), Sigru (Moringa).
2. Mix these powders in a khalva yantra (grinding vessel) and triturate them with the required amount of kanji to prepare a fine kalka.
3. Apply the prepared kalka thickly onto a cloth.
4. Place the appropriate quantity of niyamita parada (regulated mercury) on the cloth.
5. Fold the cloth and tie it to form a pottali.
6. Hang the pottali in a dolayantra (a specialized apparatus) filled with kanji as the liquid medium.
7. Carefully place the dolayantra over a mild fire.
8. Boil the mixture for three days, with each boiling session lasting 8 hours per day over moderate heat.
9. Replace the kanji in the dolayantra with fresh kanji daily and continue boiling.

Parada Jarana

Introduction

- The term "Jarana" comes from the root word "Jirnana," which means "to digest."
- Jarana is the thirteenth of the eighteen Samskaras (purification processes) of Parada (mercury) in Ayurvedic alchemy.
- In Ayurveda, Samskara refers to detoxification methods of metals, and Jarana is a phase where a metal is fully digested or assimilated into mercury (Rasa).
- After mercury digests a metal, the metal ceases to exist, and there is no increase in weight during the process. The activated mercury can then be transmuted into silver or gold.
- Throughout the Jarana process, mercury retains its original form and appearance, even after ingesting substances like Abharaka Sattva (purified mica), Gandhaka (sulfur), or Svarna (gold).
- This process enhances mercury with therapeutic and Rasayana (rejuvenating) properties.

Historical Development

- The detailed description of Gandhaka Jarana (the digestion of sulfur) and its effects is historically found in the text Rasendra Chintamani, dating back to the 12th century A.D.
- Earlier references to Gandhaka Jarana can be found in texts such as Rasarnava, Rasendra Chudamani, and Rasa Prakasha Sudhakara.
- Vanga Jarana (the digestion of tin) is described in the text "Rasa Tarangini."

Nirukti

- Jarana word is derived from **'jar'** Dhatu.
- It means to digest, assimilate or decay.

दुतग्रासक्षय एव जारणा।
After digestion of Dhatu in Parada is known as Jarana.

Definition

जारणा हि नाम गालनपातनव्यतिरेकेण ग्रस्तघनहेमादिरसस्य पूर्वावस्थाप्रतिपन्नत्वम्। (Ay. Pra. 1/107)

Jarana is the process through which substances such as Ghana (herbal extracts), Hema (gold), Sattva (metallic essence), Ratna (gemstones), and others are completely assimilated into Parada (mercury) in a manner that prevents them from returning to their original form without specific procedures like Galana (filtering) or Patana (sublimation). This process does not merely increase the weight of Parada through the addition of these substances; rather, it entails their full digestion and absorption within Parada, resulting in a homogeneous mixture that is inseparable from the incorporated substances.

Lakshana

दुतग्रासपरीणामो विडयन्त्रादियोगः।
जारणेत्युच्यते तस्याः प्रकाराः सन्ति कोटिशः।
(Rasen.Chu. 4/102)

When metals and minerals are processed in a molten state with the help of Vida Dravya using various yantras (such as Kachhapa Yantra, Valuka Yantra, Tula Yantra, etc.), they become assimilated into Parada (mercury). This process is known as Jarana.

Aim

रसगुणबलिजारणं विनाऽयं न खलुरूजाहरणक्षमोरसेन्द्रः।
न जलदकल धौतपाकहीनः स्पृशति रसायन तामिति प्रतिज्ञा।।
(Ay. Pra.)

- Without undergoing the Gandhaka Jarana process six times, mercury will not be effective for therapeutic purposes and should not be used for treatment.
- Similarly, if Abhraka Sattva or Gold is not properly digested, it will not be effective for Rasayana (rejuvenation) purposes.

वसूविध विधि संस्कृतोऽपि सूतोरस विबुधैरिह हिंगुलात्थितो वा
रसगुण बलिजारण विहिनो गदगण वारणातां तु नैतिनूनम्।।
(R.T. 5/101)

The disease-curing properties of mercury only become apparent after it has undergone the sculpture digestion process six times, regardless of whether the mercury is Ashta Sanskarita or Hingulottha.

Classification of Jarana

भूचरी जारणा प्रोक्ताखेचरीं जारणा शृणु।। (Rasarnava)

1. Bhucari Jarana
2. Khecari Jarana.

जारणा द्विविधा बालजारणा वृद्धजारण।। (Rasarnava)

1. Bala
2. Vriddha

पत्राभ्र जारणां सत्वजारणान् चेति तद्विविधा।।
निर्मुखं सु मुखं चैव वासनामुखमेव च।। (Rasarnava)

1. Samukha
2. Nirmukha

Sequence for Jarana

गन्धक जारणामादौ कुर्यादथ जारणं सुवर्णस्य।
जलधर सत्त्वस्य ततो जारणमथ सर्वलोहणाम्।।
(Ay. Pra. 1/216)

1. Shuddha Gandhaka
2. Shuddha Svarna

3. Abhraka Sattva
4. All other loha jarana

General Method

1. Bahirdhuma Vidhi (Open Method)
2. Antradhuma Vidhi (Closed Method)

Stages of Jarana

ग्रासस्य चारणं गर्भेदावणं जारणं तथा।
इति त्रिरुपानिर्दिष्टाजारणावरवार्तिकैः।।
ग्रासःपिण्डः परिणामस्तिस्त्रश्चाख्याः परा: पुनः।
समुखानिमुखाचेति जारणाद्विविधापुनः।। (R.R.S. 8/69-71)

1. **Charana of Grasa**: This involves the addition of Grasa into Parada, also known as Grasa.
2. **Dravana**: This process involves liquefying Grasa in Parada, also known as Pinda.
3. **Jarana**: This process ensures that the Grasa is completely merged into Parada, also known as Parinama.

Benefits of Jarana

Sr. No.	Ratio of Parada: Gandhaka	R.T. (5/106/108)
1.	1:1 (Ekaguna Balijarita Parada)	सामान्यगदनाशनः Cure only the common ailments
2.	1:2 (Dviguna Balijarita Parada)	महारोगविधूननः Cure maharoga
3.	1:3 (Triguna Balijarita Parada)	पुंस्त्वप्रकाशनः Induce Virility
4.	1:4 (Chaturguna Balijarita Parada)	महोत्साहमेधास्मृतिविवर्धनः Improves enthusiasm, intellect, memory power
5.	1:5 (Panchaguna Balijarita Parada)	शेषगदसन्तापनशनः Cures all types of chronic ailment
6.	1:6 (Shadguna Balijarita Parada)	विविधाद्भुतकार्यकृत् Brings extraordinary powers

Murchchhana

Introduction

- Murchchhana is a crucial Ayurvedic process for detoxifying mercury and reducing its toxic effects.
- This process involves transforming mercury, with or without sulfur, into a form suitable for internal use in the body to treat various diseases.
- Unlike some other processes, mercury does not need to be converted into ashes (bhasma) to be used medicinally after Murchchhana.
- Post-Murchchhana, mercury and its compounds develop a specific disease-curing capacity, known as Vyadhighatakatva.
- Mercury, after Murchchhana, is less likely to revert to its original, toxic state.
- The process enhances the Rasayana (rejuvenating) and therapeutic properties of mercury, making it safer and more effective for medicinal use.

Definition

तत्तद्विधिप्रभेदेन रसस्याव्यभिचारतः।
व्याधिघातकता या स्यात् सा मता मूर्च्छना बुधैः।। (R.T. 6/1)

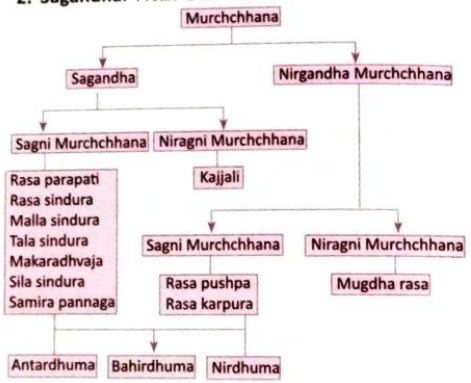
Murchchhana is the process of imparting specific therapeutic properties (Vyadhinashaka Shakti or disease-curing power) to purified mercury, used in various compound formulations (with or without sulfur), through specialized pharmaceutical procedures.

Classification

Based on the Ingridents

निर्गन्धा च सगन्धा च मूर्च्छना द्विविधा मता।
निर्गन्धा गन्धरहिता सगन्धा गन्धसंयुता।। (R.T. 6/2)

1. **Nirgandha**: Without Gandhaka
2. **Sagandha**: With Gandhaka



Based on Method of Preparation

1. **Antardhuma Murchchhana**: e.g.- Rasa Sindura, etc.
2. **Bahirdhuma Murchchhana**: e.g.- Rasa Karpura, etc.
3. **Nirdhuma**: e.g.- Kajjali

Parada Sagandha Murchchana: - 5 types—

1. **Gandha Pishti**: - e.g.- Kajjali
2. **Gandha Bandha**: - e.g.- Rasaparpati
3. **Gandha Jirana**: - e.g.- Rasa Sindura
4. **Rasa Gandha Kajjali**
5. **Dhatu Pishti**: - e.g.- Lohapishti, Tamrapishti, etc.

Lakshana of Murchchhana

कज्जलाभो यदा सूतो विहाय घनचापलम्।
मूर्च्छितस्तु तदा ज्ञेयो नानावर्णोऽपि च क्वचित्।।
(Ay. Pra. 1/395)

When mercury (Suta) attains a state similar to black collyrium (Kajjala), having lost its inherent instability or volatility, it is to be understood as 'Murchchhita' (senseless or inert), even if it may sometimes appear in various colors.

NOTE : Murchchhana Samskara is one of the Parada Ashtasamskara, distinct from the general concept of murchchhana. It is the third samskara of Parada, specifically aimed at eliminating the nasargika doshas (natural impurities) present in mercury. Through this process, the mercury attains a stabilized and immobile state, preparing it for further alchemical procedures.

Parad-Bandhas

Introduction

Bandhas in alchemy is a method of converting liquid mercury into a solid state using specific materials. The text "Rasarnava" categorizes Rasa Bandhas by their forms, including Murchchhita, Mrita, Jaloka, Pata, Bhasma, Murti, and Kota. In the Bandha Karma practice, only Divya Aushadhis (superior or divine herbs) are effective, as common herbs (Vanya Aushadhis) are inadequate for achieving Rasa Bandhas. This is due to the lack of stability in these common herbs to endure high temperatures and successfully convert mercury into the desired Kota or Bhasma form.

Definition

येन येन हि चाञ्चल्यं दुर्ग्रहत्वं च नश्यति।
रसराजस्य सम्प्रोक्तो बन्धनार्थो हि वार्तिकैः।। (R.R.S.11/60)

The process of eliminating the natural qualities of chanchalata (shiftiness), chapalata (evasiveness), and durgrahyata (elusiveness) in mercury through various pharmaceutical procedures is known as Rasa Bandha.

Properties

1. Utilized in both Lohaveda and Deha Veda.
2. Possesses virya styambana (the ability to stabilize or retain vigor).
3. Prevents aging (jara) and bestows all types of siddhis (spiritual accomplishments).
4. Strengthens the body to the hardness of a vajra (diamond).
5. Eliminates wrinkles (vali) and gray hair (palita).
6. Cures all types of diseases.
7. Endowed with the power of Veda.
8. Removes poverty (daridarata).

Types

हठारोटौ तथाऽऽभासः क्रियाहीनश्च पिष्टिका।
क्षारः खोटश्च पोटश्च कल्कबन्धश्च कज्जलिः।।
सजीवश्चैव निर्जीवो निर्बीजश्च सबीजकः।
शृङ्खलादुतिबन्धौ च बालकश्च कुमारकः।।
तरुणश्च तथा वृद्धो मूर्तिबद्धस्तथाऽपरः।
जलबन्धोऽग्निबन्धश्च सुसंस्कृतकृताभिधः।।
महाबन्धाभिधश्चेति पञ्चविंशतिरीरिताः। (R.R.S. 11/61-63)

1. Hatha Bandha
2. Arota Bandha
3. Abhasa Bandha
4. Kriyahina Bandha
5. Pishtika Bandha
6. Kshara Bandha
7. Khota Bandha
8. Pota Bandha
9. Kalka Bandha
10. Kajjali Bandha
11. Sajiva Bandha
12. Nirjiva Bandha
13. Nirbija Bandha
14. Sabija Bandha
15. Shrinkhala Bandha
16. Druti Bandha
17. Balaka Bandha
18. Kumara Bandha
19. Taruna Bandha
20. Vriddha Bandha
21. Murti Bandha
22. Jala Bandha
23. Agni Bandha
24. Susamskara Bandha
25. Maha Bandha

According to few author

केचिद्वदन्ति षड्विंशो जलूकाबन्धसंज्ञकः।
स तावन्नेष्यते देहे स्त्रीणां द्वावेऽतिशस्यते।। (R.R.S. 11/64)

Jaulaka Bandha is added as 26th bandha.

According Rasarnava: – 3 types

1. Mula Bandha
2. Rasa Bandha
3. Paka Bandha

Sr. No.	Bandhas	Quick Outline	Effect
1.	Hatha	Ashuddha Parada	Cause Diseases
2.	Arota	Shuddha Parada	Kshetrikarana (Cure many disease)
3.	Abhasa	Shuddha Parada + Kastha dravya	Cause disease
4.	Kriya Hina	Shuddha Parada + Ashuddha Dhatu	Cause disease in case of apathy
5.	Pishtika	Shuddha Parada under Sun by rubbing	Dipana and Pachana
6.	Kshara	Shuddha Parada + Bhasma of Shankha, Shukti, etc.	Dipana, Pachana and Shulaghana
7.	Khota	Shuddha Parada (Tablet form)	Useful in all disease
8.	Pota	Parparti (Kajjali use)	Useful in all disease (Specially in children)
9.	Kalka	Pankhavat Parada after Svedana	Useful in all disease
10.	Kajjali	Parada : Gandhaka used	Useful in all disease
11.	Sajiva	Parada bhasma used	No therapeutic Utility
12.	Nirjiva	Abhaka or Gandhaka Jarita Parada	Useful in all disease
13.	Nirbija	Shuddha Parada + Svarana 1/4th + Gandhaka used	Useful in all disease
14.	Sabija	Shuddha Parada + Abharaka Sattva, Svarna, Rajata, Tamra, Lauha followed by Shadguna jarana	Quick Action
15.	Shrikhala	Equal quantity of Ratan used	For both dehavada and lohavada
16.	Druti	After Bhiradruti procedure of Parada	Asadhya Rogahara
17.	Balaka	Samabhra Jarita Parada	Prevent Disease
18.	Kumara	Dvigunabhra jarita Parada	Cure Kushtha, skin disorders etc,
19.	Taruna	Chaturgunabhra jarita Parada	Cures all the disease in 7 days
20.	Vriddha	Shadgunabhra jarita Parada	Sarvakarma Upayogi
21.	Murti	Divyaushadha used	Rasayana
22.	Jala	Shilatoya	Rasayana
23.	Agni	Agni	Rasayana
24.	Susanskrita	Divyaushadhi 1/6th + Parada 1 Part + Go-mutra+ Baluka Yantra	Rasayana
25.	Maha	Parada + Svarna/ Rajat	Rasayana
26.	Jaulaka	Shuddha Parada + Kastha dravya in the shape of leech	Used as sex tool to induse orgasmin women.

Pramanikarana Paribhasha (Terms for Standardization)

Grahya-Agrahyattva

Grahya-Agrahyattva

Grahyalakshana refers to the set of standards or criteria used in Ayurveda to determine the quality and acceptability of a drug. These guidelines are essential for selecting high-quality raw materials to ensure the effectiveness, safety, and therapeutic value of Ayurvedic formulations. By adhering to Grahyalakshana, Ayurvedic practitioners and pharmacists can choose herbal and mineral substances that possess the optimal qualities necessary for medicinal use.

1. Purpose of Grahyalakshana

The primary aim of Grahyalakshana is to guarantee that the raw materials used in Ayurvedic preparations are of the highest quality. This is vital because the efficacy of the final product heavily relies on the quality of its ingredients. High-quality raw materials lead to potent medicines capable of delivering the desired therapeutic effects.

2. Criteria Considered in Grahyalakshana

The guidelines under Grahyalakshana include several factors:

1. **Appearance**: Physical characteristics like color, shape, size, and texture, which can indicate the freshness and quality of the drug.
2. **Taste and Smell**: Organoleptic properties such as taste (Rasa) and smell (Gandha), which help assess the purity and freshness.
3. **Age and Maturity**: The ideal time for harvesting or collection to achieve maximum potency; for instance, specific herbs should be harvested in particular seasons or at certain maturity levels.
4. **Absence of Contaminants**: Ensuring the raw material is free from contaminants like foreign substances, insects, molds, or chemical residues.

5. **Origin and Growing Conditions**: The geographic source and environmental conditions under which the herb or mineral was grown or collected, as these factors influence its therapeutic properties and potency. e.g.–

1. Parada

Grahya Lakshana

अन्तः सुनीलो बहिरुज्ज्वलो यो मध्याह्नसूर्यप्रतिमः प्रकाशः।
(R.Man. 1/15)

Agrahya Lakshana

.....धूम्रः परिपाण्डुरश्च चित्रो न योज्यो रसकर्मसिद्ध्यै।।
(R.Man. 1/15)

Mercury which is soft to touch and deep black inside with luster outside like a midday sun (for Rasakarma) smoky but not glittering white or any color ray should be used for preparation of such herbo mineral preparations as advised.

2. Abharaka

स्निग्धं पृथुदलं वर्णसंयुक्तं भारतोऽधिकम्।
सुखनिर्मोच्यपत्रं च तदभ्रं शस्तमीरितम्।। (R.R.S. 2/11)

1. A smooth surface
2. Thick layers
3. A mix of various colors
4. High weight
5. Layers that separate easily

राजहस्तादधस्ताद् यत्समानीतं घनं खनेः।
भवेत् तदुक्तफलदं निःसत्त्वं निष्फलं परम्।। (R.R.S. 2/3)

Abhraka is considered to possess therapeutic and transformative properties. According to these principles, if abhraka is extracted from a mine with a depth of at least one Rajahasta (approximately 22 inches), it is believed to retain the desired qualities and potency. The depth signifies that the mica has undergone sufficient natural processes and conditions to accumulate its "Sattva" or essence, which is necessary for its efficacy in various medicinal and spiritual applications.

Siddhilakshana

Definition: Siddhilakshana refers to specific markers or indicators that demonstrate the successful completion of a process during the preparation of various Ayurvedic dosage forms, such as powders, decoctions, oils, or tablets.

Purpose: The presence of Siddhilakshana ensures that the prepared formulation possesses the intended therapeutic properties, consistency, and potency according to Ayurvedic standards.

Process Validation: Siddhilakshana acts as a quality control measure, verifying that each step in the preparation has been correctly executed, and that the final product meets the intended therapeutic objectives.

Common Siddhilakshana signs include changes in color, smell, taste, texture, or viscosity, as well as specific physical changes that occur during the preparation process.

Examples: Sneha Siddhi Lakshana, Avaleha Siddhi Lakshana.

Bhasmapariksha

Bhasma Pariksha is a series of tests used to evaluate the quality and effectiveness of a bhasma—a calcined preparation of metals or minerals used for therapeutic purposes. These tests are designed to confirm that the bhasma has undergone complete transformation and is safe for medicinal use.

Some of the key bhasmapariksha methods are:

1. Varitara

मृतं तरति यत्नोये लोहं वारितरं हि तत्। (R.R.S. 8/26)

Objective: The aim of the Varitara test is to evaluate the lightness and fineness of Bhasma.

Principle: The test is based on the principle of surface tension, wherein the particles of Bhasma are so fine and light that they do not break the surface tension of the water, allowing them to remain afloat.

Procedure

1. Fill a transparent glass with stagnant water, ensuring that the water surface is still and undisturbed.
2. Take a small amount of Bhasma to be tested.
3. Gently sprinkle or place the Bhasma on the surface of the water without disturbing the water surface.
4. Watch carefully to see if the Bhasma particles float on the water
5. Interpret the Results:
   - If the Bhasma floats, it passes the Varitara test, indicating that the particles are fine and light.

• If the Bhasma sinks, it does not meet the required fineness or lightness.

2. Rekhapurnata

अङ्गुष्ठतर्जनीस्पृष्टं यत्तद्रेखान्तरे विशेत्।
मृतलोहं तदुद्दिष्टं रेखापूर्णाभिधानतः।। (R.R.S. 8/27)

Objectives: To study the micro fineness of Bhasma.

Principle

1. **Particle size**: Finer particles have a higher surface area, which enhances their bioavailability, absorption, and efficacy in the body.
2. **Surface Area and Absorption**: Micro-sized particles, has a larger surface area in proportion to its volume, allowing it to be absorbed more efficiently at a cellular level

Procedure

1. A small pinch of Bhasma is taken between the index finger and thumb.
2. Rub the Bhasma gently between the index finger and the thumb.
3. Observe whether the Bhasma particles easily enter the fine lines or grooves (Rekhas) of the skin on the fingers.
4. Result Interpretation:
   - If the Bhasma particles easily enter the fine lines or grooves of the skin, it indicates that the Bhasma is of good quality, finely prepared, and suitable for therapeutic use.
   - If the Bhasma does not enter the fine lines, it suggests that the Bhasma may not be adequately processed, indicating the presence of larger particles or impurities.

3. Unama

तस्योपरि गुरु द्रव्यं धान्यं चोपयेनद् ध्रुवम्।
ईसवत्तीर्यते वारिण्युत्तमं परिकीर्तितम्।। (R.R.S. 8/29)

Objective: The test aims to determine if the Bhasma is light enough to float on the surface of water.

Principle

1. **Porosity and Lightness**: If the Bhasma is light and porous, it will float on water, demonstrating that it has been adequately processed and incinerated.
2. **Surface Tension and Fineness**: The Bhasma should be so fine that its particles spread evenly on the water surface without breaking the surface tension.
3. **Air Entrapment**: Properly prepared Bhasma has micro-pores that trap air, making it lighter than water.

Procedure

1. Place a small amount of Bhasma (ash) on the surface of still water in a clean glass container.
2. Observe if the Bhasma remains afloat on the water surface. A properly prepared Bhasma should not sink immediately; instead, it should float on the water's surface, indicating that the Bhasma is light and porous.
3. Gently place a grain of rice or any other small, lightweight substance on top of the floating Bhasma.
4. Result Observation:
   - If the Bhasma continues to float and does not sink even with the addition of the grain, it is considered to have passed the Unmana Pariksha test, confirming that it has been properly prepared and is suitable for use.
   - If the Bhasma sinks, it suggests that the Bhasma may not be adequately prepared, as it is either too dense or lacks the required porosity.

4. Salakshanatva

Objective: Smoothness test for Bhasma is to ensure that the Bhasma is finely powdered, free of coarse particles, and suitable for therapeutic use without causing irritation or discomfort when applied or consumed.

Procedure

1. Take a small amount of Bhasma.
2. Rub it gently between the index finger and thumb.
3. Observe if the Bhasma feels smooth and does not cause any irritation or discomfort to the skin.
4. If no irritation is felt, the Bhasma passes the smoothness test, indicating it is finely powdered.

5. Sukshma

Objective: To check the micro- fineness of Bhasma

Procedure

1. Take a small amount of Bhasma.

2. Rub it gently between the index finger and thumb.
3. Ensure that the Bhasma particles feel as fine as the pollen grains of Pandanus odoratissimus (Ketaki flower).
4. The Bhasma should feel smooth and should not cause any irritation or discomfort when rubbed.
5. If the Bhasma has a texture similar to the fine pollen grains, it meets the criteria for micro-fineness.

6. Anjana Sannibha

Objective: To check the consistency with fineness.

Procedure: Same as Sukshma.

7. Dantagre na Kachakacha Bhavati

Objective: To assess the fineness and quality of Bhasma.

Procedure

1. Take a small amount of the Bhasma sample to be tested.
2. Place a small quantity of the Bhasma between the teeth.
3. Apply gentle pressure by closing the teeth together to crush the Bhasma.
4. Listen carefully to determine if any sound is produced during the crushing process.
5. If the Bhasma does not produce any sound when crushed, it indicates that the Bhasma is extremely fine and has achieved the desired particle size.
6. The absence of sound suggests that the particles are small enough and have been processed properly.

8. Varna

Aim: To verify the conversion of Bhasma into its desired metallic compound form by observing its specific color.

Each Bhasma is expected to exhibit a characteristic color that indicates successful conversion into the desired compound, as different chemical compounds have unique colors.

Procedure

1. Obtain a sample of the Bhasma to be tested.
2. Examine the color of the Bhasma under natural or white light.
3. Compare the observed color of the Bhasma with the known characteristic color expected for that specific Bhasma.
4. Each type of Bhasma is associated with a particular color that indicates proper transformation.
5. Confirm if the color of the Bhasma matches the expected specific color.
6. If the Bhasma shows the expected color, it indicates that the Bhasma has been correctly converted into the desired metallic compound form.

9. Avami

After ingestion, the Bhasma should not induce any sensation of nausea or vomiting. This criterion applies universally to all types of Bhasma, ensuring that they are properly prepared and safe for internal use.

The absence of a vomiting sensation indicates that the Bhasma is well-prepared, free from any residual impurities or toxins, and is suitable for therapeutic consumption.

10. Apunarbhava

गुडगुञ्जासुखस्पर्शमध्वाज्यैः सह योजितम्।
नायाति प्रकृतिं ध्मानादपुनर्भवमुच्यते।। (R.R.S. 8/29)

Definition

Apunarbhava means "irreversible state." This test is used to ensure that a metallic Bhasma (ash) has been properly prepared so that it does not revert to its original metallic form. If the Bhasma does not show any metallic properties after undergoing specific procedures, it is considered to have passed the Apunarbhava test.

Procedure

1. Take an equal quantity of the Bhasma to be tested and mix it thoroughly with a combination known as Mitra Panchaka, which consists of – Seeds of Abrus precatorius (Gunja seeds), Honey (Madhu), Ghee (Ghrita), Borax (Tankana), Jaggery (Guda).
2. Subject the prepared mixture to incineration (heating) at a controlled temperature in a closed vessel. This process is designed to test whether any metallic particles will re-form under the influence of the Mitra Panchaka mixture.

3. Observation:
   - After the incineration process, carefully examine the mixture for any shiny particles, metallic luster, or signs of free metal.
   - If no metallic luster or free metal particles are present, the Bhasma is considered to have passed the Apunarbhava test, indicating that it will not revert to its original metallic form.

11. Niruttha

रीध्येण सह संयुक्तं ध्मातं रीध्येण नो त्यजेत्।
तदा निरुत्थमित्युक्तं लोहं तदपुनर्भवम्।। (R.R.S. 8/30)

Definition: Niruttha refers to the test for verifying the inability of a Bhasma to regain its original metallic form. This test is particularly relevant for metallic Bhasmas to ensure that they do not revert to their elemental metal state even under specific conditions subjected to the test.

Procedure

1. Take a fixed weight of a silver piece (standardized weight) and a sample of the Bhasma to be tested.
2. Mix the Bhasma with the silver piece in a suitable container.
3. Subject the mixture to incineration (Puta) at a controlled temperature. This process involves heating the combination to high temperatures to simulate conditions that might cause any residual metallic properties of the Bhasma to interact with the silver.
4. Observation:
   - After the incineration process, carefully measure the weight of the silver piece.
   - Compare the weight of the silver piece before and after the incineration.
5. Result Interpretation:
   - If the weight of the silver piece does not increase, it indicates that the Bhasma has undergone proper transformation and does not have any residual metallic properties that could cause an increase in weight. This result confirms that the Bhasma is in its irreversible state and does not revert to a metallic form.

12. Gata Rasatva

1. Every metal has a distinct metallic taste.
2. Properly incinerated Bhasma should be tasteless when tasted.
3. The tastelessness of the Bhasma indicates that the specific metallic taste has been transformed into tasteless compounds through a unique pharmaceutical process.
4. This transformation is achieved by a specialized incineration and preparation process, ensuring the Bhasma is safe and effective for therapeutic use.

13. Nishchandratva

1. Lustre is a characteristic feature of metals.
2. Incinerated Bhasma must be Nishchandra (lustreless) before it is used for therapeutic applications.
3. To verify this, the Bhasma is observed in bright sunlight.
4. The Bhasma should show no lustre under sunlight to confirm it is properly prepared.
5. This test is specifically applicable to metallic Bhasma and Abhraka (mica) Bhasma.

14. Niramalatva

Amla Dravya are used to verify the proper preparation and quality of Bhasma. For example, curd is used to test the perfection of Tamra Bhasma, ensuring it meets the required standards for therapeutic use.

15. Nirdhumatva

Procedure

1. Take a sample of Bhasma.
2. Sprinkle the Bhasma onto a burning fire.
3. The Bhasma should not produce any smoke when it comes into contact with the fire.
4. The absence of smoke indicates that the Bhasma has been properly processed and is free from residual volatiles or impurities that could produce smoke

16. Jihvagre adahyamanatva

Jihvagre: Refers to the tip of the tongue.

Adahyamanatva: Means not causing a burning sensation

Objective: To ensure that the Bhasma is properly prepared and is free from irritants or impurities that could cause discomfort or harm when consumed.

Procedure: Jihvagre Adahyamanatva refers to the property of Bhasma whereby, upon contact with the tip of the tongue, it should not cause any burning sensation.

17. Dadhi/Nimbu Pariksha

Amla Dravya are used to verify the proper preparation and quality of Bhasma. For example, curd is used to test the perfection of Tamra Bhasma, ensuring it meets the required standards for therapeutic use.

Puraka Paribhasha (Supplementary)

1. Rudra Bhaga

भैषज्यक्रीणितद्रव्यभागोऽप्येकादशो हि यः।
वणिग्भ्यो गृह्यते वैद्यै रुद्रभागः स उच्यते।। (R.R.S. 8/3)

In traditional practice, when medicines were purchased from a 'medicine seller' by either patients or the physician themselves, a portion of the cost—specifically, 1/11th of the medicine's value—was paid by the medicine seller to the Vaidya (physician). This payment, given as a share of the medicine's price, was known as the Rudra Bhaga. It served as a form of compensation or commission for the physician's role in prescribing or endorsing the medicines.

2. Dhanvantari Bhaga

अर्धं सिद्धरसस्य तैलघृतयोर्लेहस्य भागोऽष्टमः
संसिद्धाखिललोहचूर्णवटकादीनां तथा सप्तमः।
यो दीयेत भिषग्वराय गदिभिर्निर्दिश्य धन्वन्तरिम्
सर्वाऽऽरोग्यसुखाप्तये निगदितो भागः स धन्वन्तरेः।।
(R.R.S. 8/2)

In earlier times, a physician received a portion of the medicine as a reward for their efforts in preparing a suitable remedy for the patient at the patient's expense. This share, given in gratitude and reverence, was known as the Dhanvantari Bhaga.

After the medicine was prepared, the patient or their family would offer a portion of the medicine to the physician, intending to honor them and seek blessings for good health in the name of Lord Dhanvantari, the deity of Ayurveda. The percentage of the share varied depending on the type and dosage form of the medicine, as outlined below:

Sr. No.	Dosage form	Bagha
1.	Rasaushadhis, Taila/ Ghrita paka	1/2th Part
2.	Avaleha	1/8th Part
3.	Bhasma, Churna, Vati Gutika, Modaka, Asavarishta	1/7th Part

Mana-Paribhasha

Introduction

- Mana in the context of Ayurveda and other traditional sciences, refers to the system of measurement used to quantify weight, length, or capacity.
- Mana is essential for gaining a comprehensive insight into any scientific discipline, as accurate knowledge of measurement is fundamental for precise analysis and application.
- Without an understanding of Mana, it is impossible to approach any subject thoroughly.
- In Ayurvedic remedies, the correct use of Mana ensures the proper dosage and formulation of treatments, which is critical for their effectiveness and safety.
- Thus, Mana Paribhasha plays a crucial role in the standardization of Ayurvedic practices.

Definition

मीयतेऽनेनेति मानम्। (Amarkosha)

Mana refers to the system or method used for making weights and measurements.

Importance

न मानेन विना युक्तिर्द्रव्याणां जायते क्वचित्।
अतः प्रयोगकार्यार्थं मानमत्रोच्यते मयः।।
(Sha.Sa.Pu.Kh. 1/14)

Without proper measurement (mana), the correct formulation or effectiveness (yukti) of substances (dravya) can never be achieved. It means that precise measurements are crucial in ensuring that medicinal preparations work as intended.

Therefore, I (the author) am describing the system of measurement (mana) necessary for effective application (prayoga) of medicinal substances.

परिमाणं विना क्वापि नागदाज्जायते फलम्।
तस्मात् सर्वे यतन्तेऽत्र परिमाणविधौ सदा।। (Vai.P.Pra. 1/5)

Without proper measurement (parimana), the desired result (phalam) cannot be attained (na

jayate) in any action (kvapi). This suggests that whether in medicinal practices, scientific work, or other activities, the correct outcome depends on accurate measurement.

Therefore (tasmat), everyone (sarve) should always strive (yatante) to follow the rules of measurement (parimana-vidhi) diligently and constantly (sada). This emphasizes the need for everyone involved in any technical or medicinal practice to pay close attention to precision and proper proportions at all times.

Type

मानं च द्विविधं प्राहुः कालिङ्गं मागधं तथा।
कालिङ्गान्मागधं श्रेष्ठमेवं मानविदो विदुः।। (Ch.K. 12/105)
कलिङ्गं मागधं चेति द्विविधं मानमुच्यते।
कलिङ्गान् मागधं श्रेष्ठं मानं मानविदो विदुः।।
(Sha.Sa.Pu.Kh. 1/43-44)

1. **Kalinga Mana**- Orissa State - Ruled by Kalinga Dynasty- Followed by Acharya Charaka.
2. **Magadha Mana**- Bihar State - Ruled by Maurya Dynasty- Followed by Acharya Sushruta.

According to Amarakosha

3 Types

1. Pautava Mana
2. Druvaya Mana
3. Payya Mana

1. Pautava Mana

Magadha Mana

त्रसरेणुर्बुधैः प्रोक्तस्त्रिंशता परमाणुभिः।।
त्रसरेणुस्तु पर्यायनाम्ना वंशी निगद्यते।
जालान्तरगते भानौ यत्सूक्ष्मं दृश्यते रजः।।
तस्य त्रिंशत्तमो भागः परमाणुः स कथ्यते।
जालान्तरगतैः सूर्यकरैर्वंशी विलोक्यते।।
षड्वंशीभिर्यवीचिः स्यान्नाभिः षड्भिस्तु राजिका।
तिसृभी राजिकाभिश्च सर्षपः प्रोच्यते बुधैः।।
यवोऽष्टसर्षपैः प्रोक्तो गुञ्जा स्यात् तच्चतुष्टयम्।
षड्भिस्तु रत्तिकाभिः स्यान्माषको हेमधान्यकौ।।
माषैश्चतुर्भिः शाणः स्याद्धरणः स निगद्यते।
टङ्कः स एव कथितस्तद्द्वयं कोल उच्यते।।
क्षुद्रको वटकश्चैव द्रङ्क्षणः स निगद्यते।
कोलद्वयं च कर्षः स्यात् स प्रोक्तः पाणिमानिका।।
अक्षं पिचुः पाणितलं किञ्चित्पाणिश्च तिन्दुकम्।
बिल्वप्रदः स्मृतो वैद्यैस्तथा षोडशिका मता।।
कर्मण्यो हंसपदं सुवर्णं कृवत्सग्रहः।
उदुम्बरं च पर्यायैः कर्ष एव निगद्यते।।
स्यात्कर्षाभ्यामिर्धपलं शुक्तिरष्टमिका तथा।
शुक्तिभ्यां च पलं ज्ञेयं मुष्टिराद्यं चतुर्थिका।।
प्रकुञ्चः षोडशी बिल्वं पलमेवात्र कीर्त्यते।
पलाभ्यां प्रसृतिर्ज्ञेया प्रसृतश्च निगद्यते।।
प्रसृतिभ्यामञ्जलिः स्यात्कुडवोऽर्धशरावकः।
अष्टमानं च स ज्ञेयः कुडवाभ्यां च मानिका।।
शरावोऽष्टपलं तद्वज्ज्ञेयमत्र विचक्षणैः।
शरावाभ्यां भवेत्प्रस्थश्चतुःप्रस्थैस्तथाढकम्।।
भाजनं कंसपात्रं च चतुःषष्टिपलं च तत्।
चतुर्भिराढकैर्द्रोणः कलशो नल्वणोन्मनौ।।
उन्मानश्च घटो राशिर्द्रोणपर्यायवाचकाः।
द्रोणाभ्यां शूर्पकुम्भौ च चतुःषष्टिशरावकः।।
शूर्पाभ्यां च भवेद् द्रोणी वाहो गोणी च सा स्मृता।
द्रोणीचतुष्टयं खारी कथिता सूक्ष्मबुद्धिभिः।।
चतुःसहस्रपलिका षण्णवत्यधिका च सा।
पलानां द्विसहस्रं च भार एकः प्रकीर्तितः।।
तुला पलशतं ज्ञेया सर्वत्रैवैष निश्चयः।
(Sha.Sa.Pu.Kh. 1/15-32)

S.I. Unit of Pautava Mana: Pramanu that means the floating dust particle seen in a beam of light entering a dark room.

Sr. No.	Unit		Metric Equivalent
1.	30 Pramanu	1 Vamshi	0.0362 mg
2.	6 Vamshi	1 Marichi	0.217 mg
3.	6 Marichi	1 Rajika	1.3021 mg
4.	3 Rajika	1 Sarshap	3.90 mg
5.	8 Sarshapa	1 Yava	31.25 mg
6.	4 Yava	1 Gunja	125 mg
7.	6 Gunja	1 Masha	750 gms
8.	4 Masha	1 Shana	3 gms
9.	2 Shana	1 Kola	6 gms
10.	2 Kola	1 Karsha	12 gms
11.	2 Karsha	1 Shukti	24 gms
12.	2 Shukti	1 Pala	48 gms
13.	2 Pala	1 Prasrti	96 gms
14.	2 Prasriti	1 Kudava	192 gms
15.	2 Kudava	1 Sarava	384 gms
16.	2 Sarava	1 Prastha	768 gms
17.	4 Prastha	1 Adhaka	3.072 kgs
18.	4 Adhaka	1 Drona	12.288 kgs
19.	2 Drona	1 Shurpa	24.576 kgs
20.	2 Shurpa	1 Droni	49.152 kgs
21.	4 Droni	1 Khari	196.608 kgs
22.	20 Tula	1 Bhara	96 kgs

Synonyms

Sr. No.	Mana	Synonyms
1.	1 Gunja	Ratti, Rakti
2.	1 Masha	Rajamasha, Hema, Dhanyaka
3.	1 Shana	Tanka, Dharana
4.	1 Kola	Kshudraka, Vataka, Drankshana
5.	1 Karsha	Paanimanika, Aksha, Akshapichu, Paanitala, Panitinduka, Vidalpadaka, Sahodashika, Karmadhya, Hamspada, Suvarna, Kavalgrah, Udumbara
6.	1 Shukti	Ardhapala, Ashtamika
7.	1 Pala	Musthi, Aamra, Chaturthika, Prakuncha, Shodas Bilwa
8.	1 Prasriti	Prasrita
9.	1 Kudava	Anjali, Ardha sharava, Ashtamana
10.	1 Sarava	Manika, Ashtapala
11.	1 Adhaka	Bhajana, Kamspatra, Chatuhshashilipala
12.	1 Drona	Kalash, Nalvana, Armana, Unimana, Ghata Rashi
13.	1 Shurpa	Kumbha, Chatursashti Sharava
14.	1 Droni	Vaahi, Goni

माष टङ्क अक्ष बिल्वानि कुडवः प्रस्थमाढकम्।
गशि र्गोणी खारिकेति यथोत्तरचतुर्गुणाः।।
(Sha.Sa.Pu.Kh. 1.33)

Sr. No.	Unit		Metric Equivalent
1.	1 Masha	1 Tanka	3 gms
2.	4 Tanka	1 Aksha	12 gms
3.	4 Aksha	1 Bilava	48 gms
4.	4 Bilava	1 Prastha	192 gms
5.	4 Prastha	1 Adhaka	3 kgs
6.	4 Adhaka	1 Rashi	12.288 kgs
7.	4 Rashi	1 Droni	49.152 kgs
8.	4 Droni	1 Khari	196.6 kgs

Kalinga Mana

यवो द्वादशभिर्गौरसर्षपैः प्रोच्यते बुधैः।
यवद्वयेन गुञ्जा स्यात् त्रिगुञ्जो वल्ल उच्यते।।
माषो गुञ्जाभिरष्टाभिः सप्तभिर्वा भवेत् क्वचित्।।
स्याच्चतुर्माषकैः शाणः स निष्कष्टङ्क एव च।
गद्याणो माषकैः षड्भिः कर्षः स्याद्दशमाषकः।।
चतुष्कर्षैः पलं प्रोक्तं दशशाणमितं बुधैः।
चतुष्पलैश्च कुडव प्रस्थाद्याः पूर्ववन्मताः।।
(Sha.Sa.Pu.Kh. 1.39-42)

Sr. No.	Unit		Metric Equivalent
1.	12 Gaurasarshapa	1 Yava	62.5 mg
2.	2 Yava	1 Gunja	125 mg
3.	3 Gunja	1 Valla	375 mg
4.	4 Masha	1 Shana	4 gms
5.	6 Masha	1 Gadyana	6 gms
6.	10 Masha	1 Karsha	10 gms
7.	4 Karsha	1 Pala	40 gms
8.	4 Pala	1 Kudava	160 gms

2. Druvaya Mana

स्नेहे ग्रन्थिद्वयं यावन्निमग्ना चोद्धृता ततः।
तर्जनीयं स्ववेद्बिन्दुः सा मात्रा बिन्दुसंज्ञिता।।
(Sha.Sa.U.Kh. 8/39)

S.I. Unit of Druvaya Mana: 1 Bindu that means drop of liquid which falls from index finger after it is lifted from water.

बिन्दुभिश्चाष्टभिः शाणः प्रोक्तश्चैव भिषक्तमैः।
द्वात्रिंशद्बिन्दुभिश्चात्र शुक्तिश्चैव निगद्यते।।
द्वे शुक्ति पाणि शुक्तिश्च नस्यकर्मणि पूजिता। (Todranand)

Sr. No.	Unit		Metric Equivalent
1.	8 Bindu	1 Shana	0.48ml
2.	32 Bindu	1 Shukti	1.92ml
3.	64 Bindu	1 Paanishukti	3.84ml

- **Note**: One Drop = 0.06 ml Approx.
- **Kudava Patra**

मृद्वृक्षवेणुलोहादेर्भाण्डं यच्चतुरङ्गुलम्।।
विस्तीर्णं च तथोच्चं च तन्मानं कुडवं वदेत्।
(Sha.Sa.Pu.Kh. 1/35)

Kudava Patra is a vessel made of mud, wood, bamboo or metal measuring four angula length breadth and depth.

3. Payya Mana

The Measurement of length is called Payya Mana

Sr. No.	Unit		Metric Equivalent
1.	1 Angula	8 Yava	1.95 cm
2.	1 Vitasti	12 Angula	23.4 cm
3.	1 Aratni	22 Angula	42.9 cm
4.	1 Hasta	24 Angula	46.8 cm

Application

1. Measurement of Puta.
2. Measurement of Drava Dravya.

Modern- Conversion chart as per AFI

Weight and Measures

The following table of metric equivalents of weights and measures in the Ayurvedic classics have

been approved by the Ayurveda Pharmacopoeia Committee in consultation with Indian Standards Institution.

Classical Unit	Metric Equivalent
1 Ratti or Gunja	125 mg
1 Masha	1 gm
12 Masha	12 gms
1 Tola/Karsha	12 gms
2 Karsha	24 gms
1 Pala	48 gms
1 Prasriti	96 gms
1 Kudava	192 gms
1 Manika	384 gms
1 Prastha	768 gms
1 Adhaka	3 kg. 73 gms
1 Drona	12 kg.228 gms
1 Shurpa	24 kg. 576 gms
1 Droni	49 kg. 152 gms
1 Khari	196 kg. 608 gms
1 Tula	4 kg. 800 gms
20 Tula/ 1 Bhara	96 kg.

Linear Measures

Sr. No.	Classical Unit	Inches	Metric Equivalent
1.	Yavodara	1/8 of ¾	0.24 cm
2.	Angula	¾	1.95 cm
3.	Vitasti	9	22.86 cm
4.	Aratni	10.5	41.91 cm
5.	Hasta	18	45.72 cm
6.	Nipahasta/ Rajahasta	22	55.55 cm
7.	Vyama	72	182.88 cm

Scientific Metrology

It is the branch of metrology, the science of measurement that deals with establishing and maintaining units of measurement, measurement standards, and their accuracy. It involves developing methods, instruments, and systems that allow for precise and reliable measurements in various scientific and technological fields.

Aim: To ensure that measurements are consistent, traceable, and comparable on a global scale.

Applications

1. Used in industries like healthcare (for calibrating medical devices)
2. Telecommunications
3. Physics research, and more.
4. Advances scientific research and innovation.

Types

1. Scientific Metrology
2. Industrial Metrology
3. Legal Metrology

Imperial Units

Weight Measures

Sr. No.	Imperial Units	Metric Units
1.	1 Milligram	0.001 gm
2.	1 Centigram	0.01 gm
3.	1 Decigram	0.1 gm
4.	1 Gram	0.001 kg
5.	1 Kilogram	0.001 Metric Ton
6.	1 Metric ton	1000 kgs
7.	1 Grain	64.75 gms
8.	1 Ounce	28.35 gms
9.	1 Pound	453.59 gms
10.	1 Quintal	100 kgs

Liquid Measures

Sr. No.	Imperial Units	Metric Units
1.	1 Centiliter	10 milliliters
2.	1 Liter	100 centiliters
3.	1 Liter	1000 milliliters
4.	1 tea spoon	5 ml
5.	1 Table spoon	15 ml
6.	1 Fluid Ounce	30 ml
7.	1 Cup	237 ml
8.	1 Pint	473 ml
9.	1 Quart	946 ml
10.	1 Gallon	3.7854 Lt.

Linear Measures

Sr. No.	Imperial Units	Metric Units
1.	1 Inch	2.54 cm
2.	1 Foot	30.48 cm
3.	1 Yard	91.44 cm
4.	1 Mile	1.6 km
5.	1 Furlong	220 yards

Essential Kala- Mana

Measure of time is known as kala mana.

Sr. No.	Units		Modren (AFI)
1.	1 Kshana	Lava/ An Instant	–
2.	2 Lava	1 Nimesha	–
3.	3 Nimesha	1 Kastha	4.66 seconds
4.	1 Ghati		24 mintues
5.	30 Kasthas	1 Kala	2 Minutes 20 seconds
6.	20 Kala + 3 Kashthas	1 Muhurtas	48 Mintues
7.	30 Muhurtas	1 Ahoratras	24 Hours
8.	15 Ahoratras	1 Pakshas	15 Days
9.	2 Pakshas	1 Masa	30 Days/1 Month
10.	2 Masa	1 Ritu	2 Months
11.	3 Ritu	1 Ayanas	6 Months
12.	2 Ayanas	1 Samvatsara	12 Months/One Year
13.	5 Samvatsara	1 Yuga	5 Years
14.	One Ahoratras of Devas		1 Year
15.	One Ahoratras of Pitaras		1 Month

Multiple Choice Questions

1. **Which term in Ayurveda is described as a "lamp" that illuminates and clarifies unclear, unmentioned, partially expressed, or ambiguous concepts?**
   a. Aushadha b. Bheshaja
   c. Paribhasha d. Samskara
2. **Which of the following terms is defined as "substances that bear osa (also known as rasa), which leads to arogya (health)"?**
   a. Kalpana b. Kashaya
   c. Aushadha d. Samskara
3. **What does the term "Kalpana" in Ayurveda refer to?**
   a. A process involving the removal of toxins
   b. A method for the preparation of pharmaceutical products
   c. A therapeutic oil massage
   d. A meditation practice
4. **Which of the following is NOT considered a "Pancha Kashaya Yoni" (source of Kashaya)?**
   a. Madhura b. Lavana
   c. Katu d. Tikta
5. **What does "Bheshaja" refer to in Ayurvedic terminology?**
   a. A person who practices Ayurveda
   b. A substance or treatment that alleviates disease.
   c. A type of Panchakarma therapy
   d. A plant used for spiritual practices
6. **Which processing technique in Ayurveda involves the use of heat to transform the pharmacological actions of a substance?**
   a. Manthana b. Agni Sannikarsha
   c. Shodhana d. Jala Sannikarsha
7. **What is the primary purpose of "Samskara" in the context of Aushadha Kalpana?**
   a. To cleanse the body
   b. To enhance the pharmacological actions of drugs
   c. To diagnose diseases
   d. To prescribe treatment plans
8. **Which term refers to the strategic planning and methodology involved in the preparation of Ayurvedic medicines?**
   a. Kashaya b. Kalpana
   c. Bheshaja d. Aushadha
9. **Which term is used to describe the action of removing or driving away a disease from the body in Ayurveda?**
   a. Kashaya b. Samskara
   c. Aushadha d. Kalpana
10. **Which of the following techniques is employed in Aushadha Kalpana for enhancing the potency of a drug?**
    a. Desha b. Bhavana
    c. Shodhana d. Manthana
11. **What is the Sanskrit term for Mercury in Rasa Shastra?**
    a. Rasendra b. Parada
    c. Misraka d. Aushadha
12. **Which of the following Maharasa Dravyas is known as "Pyrites"?**
    a. Vimala b. Abharaka
    c. Makshika d. Sasayaka
13. **What is the chemical formula of Vimala, or Iron Pyrite?**
    a. $CuSO_4.5H_2O$ b. FeS_2
    c. ZnO d. CaF_2

14. **Which Maharasa is referred to as "Tourmaline" in English?**
a. Makshika b. Vikranta
c. Rasaka d. Chapala

15. **What does the term "Bheshaja" refer to in Ayurveda?**
a. The patient b. The physician
c. The medicine d. The attendant

16. **Which Maharasa is also known as "Blue Vitriol"?**
a. Chapala b. Sasayaka
c. Rasaka d. Hingula

17. **Which Maharasa has the chemical formula CuFeS2?**
a. Makshika b. Sasayaka
c. Vimala d. Abharaka

18. **What is the primary objective of the Samskara process in Ayurveda?**
a. To categorize different types of medicines
b. To increase the potency of the medicines
c. To classify herbs based on their taste
d. To determine the correct dosage of medicine

19. **Which Maharasa is known as "Mica" in English?**
a. Rasaka b. Abharaka
c. Chapala d. Shilajatu

20. **Which of the following Maharasa Dravyas is synonymous with "Zinc Mineral"?**
a. Rasaka b. Makshika
c. Chapala d. Vimala

21. **Which of the following is classified as Uparasa in Ayurveda?**
a. Parada b. Gandhaka
c. Abharaka d. Makshika

22. **What is the chemical formula for Haratal (Orpiment)?**
a. As_2S_3 b. Sb_2S_3
c. $FeSO_4$ d. ZnO

23. **Which Uparasa is known as "Realgar" in English?**
a. Haratal b. Manashilla
c. Anjana d. Kankustha

24. **What is the English name for "Kasisa"?**
a. Alum b. Green Vitriol
c. Collyrium d. Gamboge tree extract

25. **Which Sadharana Rasa is also known as "Ammonium Chloride"?**
a. Gauripashana b. Navasadara
c. Kampillaka d. Hingula

26. **What is the chemical formula of Girisindura, or Red Oxide of Mercury?**
a. HgS b. As_2O_3
c. HgO d. PbO

27. **Which of the following is used in Parada Samskara (processing of mercury)?**
a. Rasanjana b. Kanshi
c. Gauripashan d. Manashilla

28. **Which substance, also known as "Cinnabar," is classified as a Sadharana Rasa?**
a. Hingula b. Karparda
c. Girisindura d. Mridarashringa

29. **What is the English name for the Uparasa "Kankustha"?**
a. Alum b. Gamboge tree extract
c. Realgar d. Collyrium

30. **Which Sadharana Rasa is referred to as "Litharge" in English?**
a. Agnijara b. Mridarashringa
c. Girisindura d. Navasadara

31. **What is the English name for "Svarna"?**
a. Silver b. Copper
c. Gold d. Tin

32. **Which of the following is known as "Pyrites" in English?**
a. Makshika b. Abharka
c. Tutha d. Nilanjana

33. **What is the chemical formula of "Tamra"?**
a. Fe b. Cu
c. Ag d. Pb

34. **Which Dhatu is an alloy made up of 8 parts copper and 2 parts tin?**
a. Kansya b. Pittala
c. Varta d. Vanga

35. **Which of the following is classified as "Upadhatu" in Ayurveda?**
a. Svarna b. Tuttha
c. Vanga d. Naga

36. **What is the English name for "Haratala"?**
a. Realgar b. Orpiment
c. Peacock ore d. Calamine

37. **Which of the following metals is referred to as "Yashada" in Sanskrit?**
a. Lead b. Zinc
c. Iron d. Tin

38. **What is the composition of "Varta" in Dhatu Varga?**
a. Alloy of three metals b. Alloy of five metals
c. Pure copper d. Pure iron

39. **Which "Upadhatu" is also known as "Galena" in English?**
a. Tutha b. Abharka
c. Nilanjana d. Manahshila

40. **What is the chemical formula for "Rasaka" when it is in the form of Zinc Sulphide?**
a. ZnO b. ZnS
c. $ZnCO_3$ d. $ZnSiO_4$

41. **What is the English name for "Manikya"?**
a. Pearl b. Ruby
c. Sapphire d. Diamond

42. **Which Ratna is known for its chemical formula Al_2O_3?**
a. Mukta b. Vajra
c. Nilama d. Gomeda

43. **Which of the following is classified as an "Upa-ratna"?**
a. Manikya b. Pushparaga
c. Suryakanta d. Gomeda

44. **What is the chemical formula of "Saphatika"?**
a. SiO_2 b. $CaCO_3$
c. Al_2O_3 d. C

45. **Which Ratna is used in Ayurveda for the purpose of binding mercury (Rasa Bandha) and facilitating digestion (Jarana) of mercury in Parada Kechari?**
a. Mukta b. Manikya
c. Vajra d. Nilam

46. **What is the English name of "Vaikranta" in Uparatna?**
a. Moonstone b. Tourmaline
c. Sunstone d. Turquoise

47. **Which Ratna is described with the chemical formula $Be_3Al_2(SiO_3)_6$?**
a. Ruby b. Emerald
c. Cat's Eye d. Topaz

48. **Which of the following Uparatna is known as "Moon Stone" in English?**
a. Rajavarta b. Chandrakanta
c. Saphatika d. Vaikranta

49. **What is the English equivalent of "Rajavarta" in Uparatna?**
a. Sun Stone b. Lapis Lazuli
c. Tourmaline d. Turquoise

50. **Which of the following has the chemical formula $CuAl_6(PO_4)_4(OH)_8 \cdot 4H_2O$?**
a. Perojika b. Mukta
c. Pushparaga d. Vaidurya

51. **What does the term "Shuddha" specifically refer to in the context of "Shuddha Varga"?**
a. Water b. Milk
c. Limestone d. Honey

52. **Which classical text refers to the "Shuddha Varga" as "Shukla Varga"?**
a. Rasamrita
b. Bhaishajya Ratnavali
c. Rasarnava
d. Charaka Samhita

53. **Which of the following substances in the "Shuddha Varga" has the chemical formula $CaCO_3$?**
a. Godanti b. Tankana
c. Shankha d. Mrigshringa

54. **Which of the following is NOT included in both the Bhaishjya Ratnavali and Rasamrita texts?**
a. Shankha b. Shukti
c. Godanti d. Sambhuka

55. **What is the chemical composition of "Tankana," a substance included in "Sudha Varga"?**
a. $CaSO_4 \cdot 2H_2O$
b. $Na_2B_4O_7 \cdot 10H_2O$
c. $Ca_3(PO_4)_2$
d. $CaCO_3$

56. **What is the term "Visha" in Ayurveda primarily associated with?**
a. A substance that brings about happiness and health
b. A substance that causes misery and suffering
c. A type of Ayurvedic herb used in healing
d. A special kind of mineral used in treatments

57. **Which of the following is NOT considered a type of Visha according to Ayurveda?**
a. Halahala b. Kalakuta
c. Amrita d. Vatsanabha

58. **What is the English name for "Vatsanabha"?**
a. Poison Nut Tree b. Glory Lily
c. Monk's Hood d. Indian Oleander

59. **Which chemical compound is primarily found in "Vatsanabha"?**
a. Strychnine b. Morphine
c. Aconitine d. Oleandrin

60. What is the English name for "Gunja," a type of Upavisha?
a. Opium b. Crab's Eye
c. Indian Hemp d. Poison Nut Tree

61. Which of the following Upavisha is known for containing the toxic protein "Abrin"?
a. Gunja b. Ahiphena
c. Dhatura d. Bhallataka

62. Which Upavisha is derived from the latex of the Calotropis gigantea plant?
a. Langali b. Arka Kshira
c. Snuhi Kshira d. Karavira

63. Which Upavisha contains "Colchicine" as a toxic compound?
a. Langali b. Karavira
c. Bhanga d. Kuchala

64. What are the main toxic compounds found in "Ahiphena" (Opium)?
a. Atropine, scopolamine, hyoscyamine
b. Morphine, codeine, thebaine
c. Strychnine, brucine, loganin
d. Abrin, abric acid, glycyrrhizin

65. Which of the following substances is categorized under "Upavisha" in Ayurveda and is also known as Indian Oleander?
a. Karavira b. Jayaphala
c. Bhallataka d. Dhatura

66. What is the primary characteristic of Kajjali as described in Ayurvedic texts?
a. A mixture of purified mercury and sulfur with a fine, black, collyrium-like appearance
b. A type of herbal formulation for digestive health
c. A compound used for external application on wounds
d. A type of metallic ash used for skin treatments

67. Which of the following substances is not a part of the Mitrapanchaka group?
a. Ajya (Ghee)
b. Gunja (Rosary) Pea.
c. Tankana (Borax)
d. Guda (Jaggery)

68. What is the main application of Dravaka Gana as mentioned in the text?
a. Used for promoting hair growth
b. Used for melting metals at lower temperatures
c. Used for enhancing immunity
d. Used for wound healing

69. What is the chemical composition of the substance "Gunja" used in both Mitrapanchaka and Dravaka Gana?
a. Borax ($Na_2B_4O_7.10H_2O$)
b. Guggulsterones
c. Abrine, Arridin
d. Sucrose

70. Which process is Kajjali primarily used for in Ayurveda?
a. Apunarbhava Pariksha on Bhasma
b. Panchakarma therapy
c. Preparing herbal teas
d. Treating skin diseases

71. What is Kajjali primarily composed of according to Ayurvedic texts?
a. Purified mercury and iron
b. Purified mercury and sulfur
c. Purified mercury and lead
d. Purified mercury and copper

72. What is the appearance of Kajjali when it is prepared correctly?
a. Red like ruby b. White like milk
c. Black like collyrium d. Green like emerald

73. Which of the following is NOT a component of Mitrapanchaka?
a. Ajya (Ghee) b. Gunja (Rosary Pea)
c. Guda (Jaggery) d. Tankana (Borax)

74. What is the main purpose of using Mitrapanchaka in Ayurvedic practices?
a. To strengthen the immune system
b. To assist in the liquefaction of metals
c. To promote mental clarity
d. To enhance skin texture

75. Which substance in Mitrapanchaka is known for containing Guggulsterones?
a. Gunja (Rosary Pea)
b. Tankana (Borax)
c. Ksoudra (Honey)
d. Guggulu (Indian Bedellium)

76. Which process is Kajjali used for in Ayurveda?
a. Sattvapatana Process b. Panchakarma
c. Nasya d. Shirodhara

77. Which substance in Dravaka Gana is used to aid in the melting of metals at lower temperatures?
a. Honey
b. Ajya (Ghee)
c. Guggulu (Indian Bedellium)
d. Gunja (Rosary Pea.

78. Which of the following describes the chemical composition of Gunja (Rosary Pea) used in Mitrapanchaka and Dravaka Gana?
a. Fatty Acid b. Abrine, Arridin
c. Fructose, Glucose d. $Na_2B_4O_7.10H_2O$

79. What is the primary application of Dravaka Gana according to Ayurvedic texts?
a. Treating digestive disorders
b. Satwapatana Process and melting metals
c. Promoting hair growth
d. Strengthening bones

80. What is the chemical formula of Sasyaka (Blue Vitriol)?
a. $FeSO_4$ b. $CuSO_4$
c. HgS d. Na_2SO_4

81. Which safety precaution is crucial when preparing Sasyaka (Copper(II) sulfate)?
a. Conduct the experiment in a fume hood to avoid inhaling sulfur dioxide
b. Wear a lead apron to prevent radiation exposure
c. Use an oxygen mask to prevent inhaling oxygen
d. Avoid using glassware during the preparation

82. Which method is used to purify sulfur extracted from natural deposits?
a. Sublimation b. Fractional distillation
c. Filtration d. Centrifugation

83. What is the chemical reaction involved in the preparation of Kasisa (Green Vitriol) from iron and sulfuric acid?
a. $Fe + H_2SO_4 \rightarrow FeSO_4 + H_2$
b. $FeS + H_2O \rightarrow FeSO_4 + H_2$
c. $FeS_2 + H_2 \rightarrow FeSO_4 + H_2O$
d. $Fe + O_2 \rightarrow Fe_2O_3$

84. Which compound is used in the modern synthetic preparation of Rasanjana for eye diseases?
a. Copper sulfate
b. Cinnabar (HgS)
c. Darvi (Berberis aristata) decoction
d. Sulfuric acid

85. What is the primary component of Hingula, also known as cinnabar?
a. Copper sulfate b. Iron sulfate
c. Mercury sulfide d. Lead oxide

86. Which gas is used in one of the methods for preparing Hingula (Cinnabar) from mercury(II) chloride?
a. Hydrogen chloride (HCl)
b. Oxygen (O_2)
c. Nitrogen (N_2)
d. Hydrogen sulfide (H_2S)

87. What is the purpose of adding a "seed" crystal during the crystallization of Blue Vitriol ($CuSO_4$)?
a. To initiate oxidation
b. To promote rapid cooling
c. To aid in the formation of copper sulfate crystals
d. To increase the boiling point

88. In the preparation of Gandhaka (Sulfur), which method involves the reaction of hydrogen sulfide with oxygen?
a. Conversion to sulfur dioxide followed by reduction to elemental sulfur
b. Direct sublimation of sulfur ores
c. Electrolysis of sulfuric acid
d. Photochemical decomposition

89. What is one of the main uses of Kasisa (Green Vitriol) in industry?
a. As a fuel
b. As a coagulant in water treatment
c. As a solvent
d. As a food preservative

90. Which of the following is used as a substitute for Ashwagandha (Withania somnifera) due to its rejuvenating properties?
a. Mustaka (Cyperus rotundus)
b. Shatavari (Asparagus racemosus)
c. Guggulu (Commiphora mukul)
d. Punarnava (Boerhaavia diffusa.

91. Why is Vaikranta used as a substitute for Vajra in Ayurvedic treatments?
a. It is less effective but more available
b. It has similar properties and is more cost-effective
c. It is less safe and harder to prepare

d. It is used only in emergencies when Vajra is unavailable

92. Which of the following is NOT a reason for using substitute drugs in Ayurveda?
a. To increase the potency of the original herb
b. To ensure availability during shortages
c. To promote sustainability by conserving rare species
d. To reduce the cost of treatments

93. Which mineral is known as "Suvarna Makshika" and is used as a substitute for Swarna (gold) in Ayurvedic formulations?
a. Silver nitrate b. Iron oxide
c. Copper pyrite (Copper iron sulfate) d. Zinc oxide

94. What is the primary reason for using Guggulu (Commiphora mukul) as a substitute for Shilajit in Ayurvedic medicine?
a. It is more potent than Shilajita
b. It is less expensive and easier to source
c. It has similar anti-inflammatory, analgesic, and rejuvenating qualities
d. It is primarily used for skin conditions

95. What is the primary aim of Shodhana in Ayurveda?
a. To enhance the taste of medicinal substances
b. To detoxify and remove impurities from substances
c. To add artificial flavors to herbs
d. To promote the growth of medicinal plants

96. Which of the following types of Shodhana involves treating substances to remove common impurities found in elements of the same category?
a. Vishesha Shodhana b. Samanya Shodhana
c. Bhavana d. Bharjana

97. What is the purpose of the "Dhalana" technique in Shodhana?
a. To heat and vaporize substances
b. To triturate substances with liquids
c. To melt solid raw drugs and dip them in cold liquids
d. To keep substances submerged in specific liquids

98. Which of the following Shodhana techniques is used to reduce particle size and transfer impurities to a liquid medium?
a. Svedana b. Bhavana
c. Nirvapa d. Bharjana

99. What type of Shodhana is used to remove moisture content by frying or dehydrating the substance?
a. Bharjana b. Mardana
c. Nimajjana d. Svedana

100. What is the Rudra Bhaga in Ayurvedic tradition?
a. A portion of the patient's payment to the physician
b. A part of the medicine's price paid by the medicine seller to the physician
c. A reward given by the physician to the patient
d. A discount offered by the medicine seller to the patient

102. According to the traditional practice, what fraction of the medicine's value was paid as Rudra Bhaga?
a. 1/10th b. 1/12th
c. 1/11th d. 1/8th

103. Which Ayurvedic deity is associated with Dhanvantari Bhaga?
a. Lord Shiva b. Lord Dhanvantari
c. Lord Vishnu d. Lord Brahma

104. What is the purpose of giving Dhanvantari Bhaga to the physician?
a. As a form of taxation
b. As a fee for the consultation
c. As a reward for preparing a suitable remedy
d. As a gift from the medicine seller

105. What fraction of Rasaushadhis, Taila, or Ghrita paka is given as Dhanvantari Bhaga?
a. 1/2nd part b. 1/8th part
c. 1/7th part d. 1/4th part

106. For Avaleha preparations, what is the Dhanvantari Bhaga given to the physician?
a. 1/2nd part b. 1/8th part
c. 1/7th part d. 1/10th part

107. What is the Dhanvantari Bhaga share for Bhasma, Churna, Vati, Gutika, Modaka, and Asavarishta preparations?
a. 1/2nd part b. 1/5th part
c. 1/7th part d. 1/9th part

108. Which of the following statements is true about Dhanvantari Bhaga?
a. It is a form of tax collected by the government.
b. It is given as a token of respect to the physician.
c. It is a part of the prescription charges.
d. It is a mandatory fee imposed on all patients.

109. What is the main reason for giving Rudra Bhaga to the physician in Ayurveda?
a. To compensate the physician for their consultation
b. To pay for the transportation costs of the medicine
c. As a commission for prescribing or endorsing the medicine
d. To cover the manufacturing costs of the medicine

110. In the context of Ayurveda, which term refers to a portion of the medicine given in reverence to Lord Dhanvantari?
a. Rudra Bhaga b. Tarpana
c. Dhanvantari Bhaga d. Aushadhi Bhaga

111. What is the primary objective of the Marana process in Ayurveda?
a. To enhance the flavor of medicines
b. To incinerate substances into fine powders (Bhasmas)
c. To extract essential oils from plants
d. To preserve medicinal herbs in alcohol

112. Which method of Marana involves the application of controlled heat to transform substances into Bhasmas?
a. Putapaka b. Kupipakwa
c. Bhanupaka d. Agnipaka

113. What does the term 'Bhanupaka' mean in the context of Ayurvedic preparation?
a. Moon cooking b. Sun cooking
c. Fire cooking d. Water cooking

114. Which of the following methods involves cooling the Samputa naturally within the fireplace?
a. Bahirsheeta b. Agnipaka
c. Svangashita d. Kupipakva

115. What is the main benefit of the Putapaka method in the preparation of Bhasmas?
a. Using high temperatures for quicker preparation
b. Achieving consistent heat distribution for better absorption
c. Reducing the particle size through grinding
d. Exposing the substance to sunlight

116. In the Kupipakwa method, how is the heat applied to the medicinal substances?
a. Directly on an open flame
b. By immersing in boiling water
c. Within a designated glass bottle with a controlled heat pattern
d. By placing in a solar oven

117. Which type of Marana method is characterized by the exposure of substances to the sun's rays for completion?
a. Agnipaka b. Putapaka
c. Kupipakwa d. Bhanupaka

118. What is a key feature of the Agnipaka method in the Marana process?
a. Use of sunlight for heat application
b. Use of controlled heat to enhance potency and purity
c. Exposing substances to cold temperatures
d. Manual grinding of substances into powder

119. Which method ensures that the heat levels are neither too high nor too low for the preparation of Rasa Bhasmas?
a. Kupipakva b. Agnipaka
c. Bhanupaka d. Putapaka

120. Which cooling technique involves removing the Samputa from the fireplace and allowing it to cool in the ambient air?
a. Svangashita b. Bahirshita
c. Agnipaka d. Kupipakva

121. Which of the following is NOT included in the Sikata Varga as per Rasa Darpana?
a. Dugdhapashana b. Sikata
c. Vyomashama d. Badarasham

122. Which compound in Sikata Varga is also known as Talc or Soft Stone?
a. Badarasham b. Dugdhapashana
c. Nagapashana d. Trinkantamani

123. What is the English name for "Saindhava" in Lavana Varga?
a. Sea Salt b. Sochal Salt
c. Rock Salt d. Ammonium Salt

124. According to Acharya Charaka, what is the Panchabhautika composition of Lavana?
a. Jala (water) and Prithvi (earth)
b. Agni (fire) and Prithvi (earth)
c. Jala (water) and Agni (fire)
d. Vayu (air) and Agni (fire)

125. Which of the following salts is NOT recognized by Rasarnava?
a. Samudra b. Vida
c. Romaka d. Audhvida

126. What is the chemical composition of Kauseyasham in the Sikata Varga?
a. $NaAl(SiO_3)_2$
b. $MgSiO_3$ (Magnesium Silicate)
c. NaCl
d. Silicate of Lime

127. Which compound is known as 'Serpentine' or 'Ophite' in Sikata Varga?
a. Vyomashama b. Badarasham
c. Nagapashana d. Sikata

128. Which salt in the Lavana Varga is described by Acharya Sushruta as composed of Prithvi and Agni?
a. Saindhav b. Sauvarchala
c. Vida d. Romaka

129. What is the English name for 'Badarasham' in Sikata Varga?
a. Jade b. Asbestos
c. Beryl d. Sand

130. Which salt has the alternative name of "Reha Salt" in Lavana Varga
a. Vida b. Romaka
c. Audhvida d. Kancha

131. What is the primary purpose of Gandhaka Jarana in medicine?
a. To enhance the color of the medicine
b. To improve the therapeutic efficacy of mercury
c. To increase the shelf life of the medicine
d. To reduce the size of the medicinal particles

132. Which yantra is used in the Jarana process for melting metals and minerals?
a. Kachhapa Yantra b. Pinda Yantra
c. Shalaka Yantra d. Tula Yantra

133. In Jarana, what does the term 'Dravana' refer to?
a. The process of digestion of minerals
b. The process of liquefying Grasa in Parada
c. The process of adding medicinal herbs
d. The process of solidifying Parada

134. What is the purpose of the Jarana process in the preparation of mercury?
a. To purify the mercury
b. To ensure complete assimilation of Grasa into Parada
c. To enhance the color of the mercury
d. To increase the volume of the mercury

135. Which of the following substances is used for the therapeutic purpose after six times Gandhaka Jarana?
a. Asta Sanskarita b. Hingulotha
c. Both A and B d. Neither A nor B

136. What is 'Parinama' in the context of Ayurvedic medicine preparation?
a. The initial mixing of ingredients
b. The final digestion stage where Grasa is merged into Parada
c. The cooling stage after heating
d. The process of filtering the substance

137. Which Ayurvedic practice involves the use of various yantras like Kachhapa Yantra and Tula Yantra?
a. Dravana b. Charana
c. Jarana d. Shodhana

138. What is the primary outcome of the Charana process in the preparation of mercury?
a. Dissolution of metals
b. Addition of Grasa into Parada
c. Solidification of the mixture
d. Extraction of essential oils

139. For what purpose is Abhraka Sattva or Gold digested in Ayurvedic treatments?
a. For improving the color of the medicine
b. For enhancing its effectiveness in Rasayana (rejuvenation) purposes
c. For increasing the volume of the medicine
d. For changing the taste of the medicine

140. What is the significance of the number six in Gandhaka Jarana?
a. It is the number of times mercury should be heated
b. It is the number of times Gandhaka should be added
c. It is the number of times Gandhaka Jarana should be performed for therapeutic efficacy
d. It is the number of ingredients used

141. What does the term "Jarana" mean in the context of alchemy?
a. To purify b. To digest
c. To solidify d. To filter

142. Which purification process is Jarana in the sequence of Parada (mercury) Samskaras?
a. First b. Fifth
c. Thirteenth d. Eighteenth

143. What happens to the metal after it undergoes the Jarana process with mercury?
a. It increases in weight b. It ceases to exist
c. It changes color d. It forms a solid mass

144. Which ancient text provides a detailed description of Gandhaka Jarana?
a. Rasa Tarangini
b. Rasendra Chintamani
c. Rasarnava
d. Rasa Prakasha Sudhakara

145. In the Jarana process, what is the role of Vida Dravya?
a. To enhance the color of mercury
b. To help in the melting of metals and minerals
c. To filter impurities
d. To increase the volume of Parada

146. What is the term used for the complete assimilation of Grasa into Parada?
a. Dravana b. Charana
c. Parinama d. Viddha

147. Which yantras are used in the Jarana process to melt metals and minerals?
a. Kachchhapa Yantra and Tula Yantra
b. Shalaka Yantra and Pinda Yantra
c. Vaidya Yantra and Rajah Yantra
d. Pinda Yantra and Kachchhapa Yantra

148. What is the significance of performing Gandhaka Jarana six times for therapeutic mercury?
a. It increases the medicinal properties
b. It is necessary for therapeutic efficacy
c. It changes the color of the mercury
d. It reduces the weight of the mercury

149. Which of the following processes is involved in the Jarana stages?
a. Charana b. Pinda
c. Dravana d. All of the above

150. According to the text Rasayana Cudamani, what are the benefits of using Parada with a ratio of 1:5 with Gandhaka?
a. Cures common ailments
b. Induces virility
c. Cures all types of chronic ailments
d. Improves enthusiasm and memory

151. Which text categorizes Rasa Bandhas by their forms?
a. Charaka Samhita b. Sushruta Samhita
c. Rasarnava d. Ashtanga Hridaya

152. What is the primary purpose of Rasa Bandha in alchemy?
a. To enhance the flavor of herbs
b. To convert liquid mercury into a solid state
c. To increase the color of medicinal herbs
d. To prepare herbal extracts

153. According to Rasarnava, which type of Bandha is used for Rasayana?
a. Sajiva Bandha b. Murti Bandha
c. Jala Bandha d. Maha Bandha

154. Which Bandha is specifically mentioned as being used as a sex tool to induce orgasms in women?
a. Kshara Bandha b. Kajjali Bandha
c. Jaulaka Bandha d. Pota Bandha

155. Which Bandha is used to stabilize and retain vigor, and is known for preventing aging and curing diseases?
a. Nirbija Bandha b. Balaka Bandha
c. Maha Bandha d. Jala Bandha

156. Which type of Bandha is described as being used to convert Shuddha Parada into a tablet form?
a. Khota Bandha b. Abhasa Bandha
c. Sajiva Bandha d. Pota Bandha

157. What is the primary material used in Sajiva Bandha?
a. Shuddha Parada b. Gandhaka
c. Parada Bhasma d. Kashtha Dravya

158. Which Bandha type is known for having no therapeutic utility?
a. Kajjali Bandha b. Sajiva Bandha
c. Kshara Bandha d. Taruna Bandha

159. Which Bandha involves the use of Shuddha Parada and is mentioned for its quick action?
a. Shrinkhala Bandha b. Nirbija Bandha
c. Abhasa Bandha d. Kriya Hina Bandha

160. Which Bandha is described as being useful for both Dehavada and Lohavada?
a. Murti Bandha b. Shrinkhala Bandha
c. Taruna Bandha d. Kshara Bandha

161. What is the main objective of the Varitara test in Bhasma Pariksha?
a. To evaluate the micro-fineness of Bhasma
b. To assess the lightness and fineness of Bhasma
c. To check the metallic taste of Bhasma
d. To test the color of Bhasma

162. In the Rekhapurnata test, the Bhasma is rubbed between the fingers to check if:
a. The Bhasma changes color
b. The Bhasma floats on water
c. The Bhasma particles enter the fine lines of the skin
d. The Bhasma produces a sound when crushed

163. The Unama test aims to verify the:
a. Smoothness of the Bhasma
b. Irreversibility of the Bhasma
c. Ability of Bhasma to float even with added weight
d. Tastelessness of the Bhasma

164. Which of the following tests assesses the smoothness of Bhasma by rubbing it between the fingers?
a. Apunarbhava b. Rekhapurnata
c. Slakshnatva d. Niramlattva

165. The Dantagre na Kachakacha Bhavati test checks for:
a. The presence of sound when Bhasma is placed between the teeth
b. The color of Bhasma in natural light
c. The lightness of Bhasma when sprinkled on water
d. The texture of Bhasma similar to pollen grains

166. The Apunarbhava test is used to confirm that:
a. Bhasma is light and porous
b. Bhasma does not revert to its original metallic form
c. Bhasma is smooth and does not cause irritation
d. Bhasma does not produce smoke when sprinkled on fire

167. In the Niruttha test, which material is used to check the transformation of Bhasma?
a. Iron piece b. Silver piece
c. Copper piece d. Gold piece

168. Which Bhasma Pariksha involves checking the color of the Bhasma to verify its proper conversion into the desired metallic compound?
a. Avami b. Varna
c. Rekhapurnata d. Gata Rasattva

169. Nishchandratva in Bhasma testing is related to:
a. The absence of a burning sensation on the tongue
b. The smoothness of Bhasma
c. The absence of metallic luster in sunlight
d. The floating ability of Bhasma on water

170. In the Nirdhumatva test, Bhasma should:
a. Produce a sound when crushed
b. Not produce any smoke when sprinkled on fire
c. Sink in water
d. Cause a burning sensation on the tongue

171. What is the significance of "Mana" in Ayurveda?
a. To diagnose diseases
b. To purify medicines
c. To ensure proper dosage and formulation of treatments
d. To prescribe medicines

172. According to Amarkosha, what is the definition of Mana?
a. मीयतेऽनेनेति मानम् b. पच्यतेऽनेनेति मानम्
c. रोगा नाश्यते मानम् d. परिणामं विना मानम्

173. Which of the following ancient texts describes the importance of Mana?**
a. Charaka Samhita b. Sushruta Samhita
c. Amarkosha d. All of the above

174. According to the texts, without proper measurement (Mana), the correct formulation or effectiveness of substances can:
a. Always be achieved
b. Never be achieved
c. Be achieved through trial and error
d. Be irrelevant to the outcome

175. How many types of Mana are described in the Cha. Sa. K.12/105?
a. 1 b. 2
c. 3 d. 4

176. Which ancient measurement system was followed by Acharya Charaka?
a. Magadha Mana b. Kalinga Mana
c. Druvaya Mana d. Payya Mana

177. In Pautava Mana, how many Sarshapa (mustard seeds) are equivalent to one Yava?
a. 2 b. 3
c. 6 d. 8

178. In Magadha Mana, how many Gunja are equal to one Masha?
a. 3 b. 4
c. 6 d. 8

179. In Druvaya Mana, how many Bindu (drops) are equal to one Shana?
a. 4 b. 8
c. 12 d. 32

180. Which unit of measurement is defined as the "floating dust particle seen in a beam of light"?
a. Yava b. Rajika
c. Pramanu d. Gunja

181. What is the metric equivalent of one Karsha in Kalinga Mana?
a. 6 gms b. 10 gms
c. 12 gms d. 24 gms

182. According to the Ayurvedic Pharmacopoeia Committee, what is the metric equivalent of one Pala?
a. 12 gms b. 24 gms
c. 48 gms d. 96 gms

183. How many Adhaka are there in one Drona, according to the Pautava Mana system?
a. 1 b. 2
c. 3 d. 4

184. In modern terms, one "Vitasti" (a unit of length) is equal to how many centimeters?
a. 10.5 cm b. 18.4 cm
c. 22.86 cm d. 30 cm

185. What is the metric equivalent of one Tula in modern measurements?
a. 12 kg b. 24 kg
c. 48 kg d. 4.8 kg

Answer Sheet

1.	C	2.	C	3.	B	4.	B	5.	B	6.	B	7.	B	8.	B
9.	A	10.	B	11.	B	12.	C	13.	B	14.	B	15.	C	16.	B
17.	A	18.	B	19.	B	20.	A	21.	B	22.	A	23.	B	24.	B
25.	B	26.	C	27.	C	28.	A	29.	B	30.	B	31.	C	32.	A
33.	B	34.	A	35.	B	36.	B	37.	B	38.	B	39.	C	40.	B
41.	B	42.	C	43.	C	44.	A	45.	C	46.	B	47.	C	48.	C
49.	B	50.	A	51.	C	52.	C	53.	C	54.	D	55.	B	56.	B
57.	C	58.	C	59.	C	60.	B	61.	A	62.	A	63.	A	64.	B
65.	A	66.	A	67.	D	68	B	69.	C	70.	A	71.	B	72.	C
73.	C	74.	B	75.	D	76.	A	77.	B	78.	B	79.	B	80.	B
81.	B	82.	A	83.	A	84.	C	85.	C	86.	D	87.	C	88.	A
89.	B	90.	B	91.	A	92.	A	93.	C	94.	C	95.	B	96.	B
97.	C	98.	B	99.	A	100.	B	102.	C	103.	B	104.	C	105.	A
106.	B	107.	C	108.	B	109.	C	110.	C	111.	B	112.	D	113.	B
114.	C	115.	B	116.	C	117.	D	118.	B	119.	D	120.	B	121.	C
122.	B	123.	C	124.	C	125.	D	126.	B	127.	C	128.	B	129.	C
130.	C	131.	B	132.	A	133.	B	134.	B	135.	C	136.	B	137.	C
138.	B	139.	B	140.	C	141.	B	143.	B	144.	B	145.	B	146.	C
147.	A	148.	B	149.	D	150.	C	151.	C	152.	B	153.	B	154.	C
155.	C	156.	A	157.	C	158.	B	159.	B	160.	B	161.	B	162.	C
163.	C	164.	C	165.	A	166.	B	167.	B	168.	B	169.	C	170.	B
171.	C	172.	A	173.	D	174.	B	175.	B	176.	B	177.	D	178.	C
179.	B	180.	C	181.	B	182.	C	183.	D	184.	C	185.	D		

Write Short Question

1. What is the definition of Paribhasha and why is it important?
2. What is the word derivation of the term "Aushadha" ?
3. List and explain the five types of Kashaya Yoni.
4. What are the classical names and chemical composition/ formula for Rasa, Maharasa, and Uparasa?
5. What is the difference between Sudhavarga and Sikatavarga in classification?
6. What are the controversial (Sandigdha) substances such as Vaikranta and Rasanjana used for in Ayurveda?
7. Define Shodhana and explain its types, including Samanya Shodhana and Vishesha Shodhana.
8. What are the Ashtasamskara of Parada, and what is their significance?
9. Explain the process of Sattvapatana and its application.
10. What is the significance of the term "Grahya-Agrahyattva" ?
11. Explain any three Bhasma Pariksha methods such as Varitara, Rekhapurnata, and Niramlattva, and their importance in determining the quality of Bhasma.
12. What are "Rudra Bhaga" and "Dhanvantari Bhaga" in the context of Puraka Paribhasha, and why are they important in Ayurveda?
13. Define Mana-Paribhasha. How is the classical measurement system converted to modern units as per the AFI (Ayurvedic Formulary of India)?
14. What is the significance of "Essential Kala-mana" in Ayurvedic practices, and how does it impact therapeutic procedures?

Write Long Question

1. Define Paribhasha and discuss its significance in understanding Ayurvedic principles and practices, particularly in relation to drug preparation and therapeutic applications?
2. Discuss the word derivations of "Aushadha," "Bheshaja," "Kalpana," and "Kashaya." How do these terms relate to the therapeutic and medicinal formulations used in Ayurveda?
3. Classify the following Dravya/Varga: Rasa, Maharasa, Uparasa, Dhatuvarga, Upadhatu, Ratna, Uparatna, Sudhavarga, Sikatavarga, Lavanavarga, Visha, and Upavisha. Provide their English names, chemical compositions, and their relevance in Ayurvedic formulations.
4. Discuss the controversial (Sandigdha) substances such as Vaikranta, Chapala, Rasanjana, Pushpanjana, Vahnijara, Girisindura, and Kankushtha. Why are they considered controversial, and what are their potential therapeutic or medicinal uses in Ayurveda?
5. Explain the Shodhana in detail. What are the different types of Shodhana, and how do Samanya Shodhana and Vishesha Shodhana differ? Discuss the various techniques used for Shodhana such as Svedana, Mardana, Dhalana, and Nirvapa.
6. Define the Marana process in Ayurveda and discuss its significance in transforming raw materials into medicinal forms. Compare the Agnipaka, Putapaka, Kupipakva, Bhanupaka, and Swanga Sheeta methods of Marana.
7. Explain the processes of Amritikarana and Lohiti-karana in Ayurvedic medicine. Discuss their importance in the preparation of metals and minerals for therapeutic use.
8. Discuss Parada Samskara in detail. What is the significance of the Ashtasamskara, and how do they contribute to the purification and therapeutic efficacy of mercury?
9. Describe the process of Sattvapatana and Druti in Ayurveda. What are the indicators of successful Druti (Druti Lakshana), and how are these processes applied in preparing metals and minerals for medicinal use?
10. Discuss the various methods of Bhasma Pariksha, including Varitara, Rekhapurnata, Unama, and others. Explain their significance in ensuring the quality, safety, and efficacy of Ayurvedic Bhasma preparations.
11. Elaborate on the concept of Mana-Paribhasha in Ayurveda. Discuss the classical types of measurements used, their conversion into modern units as per the AFI, and the role of scientific metrolgy in standardizing Ayurvedic preparations.

3 Adharabhuta Siddhanta

• Lecture: 4 hours, non-lecture: 2 hour • • Total Marks- 5(MCQ- Yes, SAQ- Yes, LAQ- No) •

Introduction

The term "Adharabhuta Siddhanta" is a Sanskrit composition of the terms: Adharabhuta and Siddhanta.

1. **Adharabhuta**: This word is a combination of "Adhara," representing the foundation, basis, or support, and Bhuta signifying that which happened/exists. Both together, "Adharabhuta" means which is the base or fundamental principle for something.
2. **Siddhanta**: The established doctrine, conclusion, or principle. It is a term that means any declared reference point for reasoning or conduct of evaluation within a particular system of ideas.

Adharabhuta Siddhanta thus means the fundamental principle or doctrine beneath a system of thought (a philosophy). It is a central idea or basic truth from which more detailed ideas are based on.

Since pharmaceutical science is all about drugs and their process, that's why some principles are defined as below.

Dravya Sangraha and Samrakshana

"Dravya Sangraha" refers to the collection, particularly in the context of medicinal or pharmaceutical materials. It involves sourcing, selecting, and assembling the necessary components for drug formulation. "Samrakshana," means preservation or protection. In the pharmaceutical field, it emphasizes the importance of storing and maintaining the quality of these substances to ensure their efficacy and safety over time.

This concepts highlight the crucial steps of collecting and preserving medicinal substances in the preparation and maintenance of effective drugs.

a. Time of Drug Collection

The timing of drug collection is crucial for ensuring the potency and effectiveness of medicinal substances. Harvesting should be done at a time when the active ingredients in plants or other sources are at their peak, which can vary depending on the species, climate, and part of the plant being collected.

General Rule

1. शरद्यखिलकार्यार्थं ग्राह्यं सरसमौषधम्।
   विरेकवमनार्थं च वसन्तान्ते समाहरेत्।।
   (Sha.Sa.Pu.Kh. 1/67)
   - Sarada ritu (October-November) is ideal for the collection of drugs for all types of herbal preparations.
   - Vamana and virecana dravyas should be collected during the vasanta ritu (February - March).

Specific Time for Specific Plant Part Collection

तेषां शाखापलाशमचिरप्ररूढं वर्षावसन्तयोर्ग्राह्यं, ग्रीष्मे मूलानि शिशिरे च शीर्णप्ररूढपर्णानां, शरदि त्वक्कन्दक्षीराणि, हेमन्ते साराणि, यथर्तु पुष्पफलमिति । (Ch.K. 1/10)

Sr. No.	Plant Part	Ritu
1.	Shakha & Patra	Vasanta
2.	Mula	Grishma & Shishira
3.	Kanda, Kshira & Chala	Sharada
4.	Sara	Hemanta
5.	Pushpa & Phula	According to Ritu

मूलानि शिशिरे ग्रीष्मे, पत्रं वर्षावसन्तयोः।
कन्दानि शरदि क्षीरं, यथर्तुं कुसुमं फलम्।

हेमन्तेसारमोषध्या, गृह्णीयात् कुशलो भिषक्।।

(B.R., Par.Prak. 4/59)

Sr. No.	Plant Part	Ritu
1.	Mula	Grishma & Shishira
2.	Patra	Varsha & Vasanta
3.	Kanda, Kshira	Sharada
4.	Sara	Hemanta
5.	Pushpa & Phula	According to Ritu

b. Time of the Day for Drug Collection

गृह्णीयात्तानि सुमनाः शुचिः प्रातः सुवासरे।।
आदित्यसम्मुखो मौनी नमस्कृत्य शिवं हृदि।
साधारणद्रव्यं गृह्णीयादुत्तराश्रितम्।।

(Sha.Sa.Pu.Kh. 1/63, 67)

Acarya Sharangadhara has stated that the complete physical and mental well-beingness for the drug collection to collect the raw materials. The substances should be collected with a pure mind and body (**सुमनाः शुचिः**) early in the morning (**प्रातः**) on an auspicious day (**सुवासरे**). Facing the sun (**आदित्यसंमुखो**), maintaining silence (**मौनी**), and after offering salutations to Lord Shiva (**नमस्कृत्य शिवं हृदि**) in the heart, one should proceed. The common substances (**साधारणद्रव्यं**) should be collected while facing the north direction (**उत्तराश्रितम्**).

c. Collection of Pranija Dravya

जङ्गमानां वयःस्थानां रक्तरोमनखादिकम्।
क्षीरमूत्रपुरीषाणि जीर्णाहारेषु संहरेत्।। (Su.Su. 36/16)

According to ancient Indian scholar Sushruta, known as the father of surgery, Pranija Dravya (substances derived from animals) such as rakta (blood), roma (body hair), nakha (nails), kshira (milk), mutra (urine), and purisha (feces) should be collected from young, healthy mammals. These substances are believed to have powerful medicinal properties. Sushruta advises that these materials should be gathered at the right time, specifically after the animal has fully digested its food, a period known as jinaahara kala. This is important because these substances are believed to be in their cleanest and most effective state when the animal's body is not actively processing food. The use of young animals (vayastha), which have healthier body fluids and materials, is believed to produce more potent and efficacious substances.

d. Place of Drug Collection Bhumi Predominance

Mahabhuta is the categorized concept of five categories had been described — Akasha (ether/space), Vayu (air), Agni (fire), Jala (water) and Prithvi (earth). According to some scholars soil has different predominant Mahabhutas and hence each kind of soil is used for specific purposes according to the elements that dominate it.

विशेषतस्तु तत्र, अश्मवती, स्थिरा, गुर्वी श्यामा, कृष्णा वा स्थूलवृक्षशस्य प्राया स्नगुणभूयिष्ठा, स्निग्धा शीतलऽऽसन्नोदका स्निग्धशस्य तृणकोमल वृक्ष प्राया शुक्लाम्बु गुण भूयिष्ठाय नाना वर्णा लघ्वश्मवति प्रविरलाल्पपाण्डु वृक्षप्ररोहाऽग्निगुण भूयिष्ठाय रूक्षा भस्मशसभवर्णा तनु वृक्षाल्परसकोटरवृक्षप्राया ऽनिलगुण भूयिष्ठाय नाना वर्णा लघ्वश्मवति प्रविरलाल्पपाण्डु वृक्षप्ररोहाऽग्निगुण भूयिष्ठाय रूक्षा भस्मशसभवर्णा तनु वृक्षाल्परसकोटरवृक्षप्राया ऽनिलगुण भूयिष्ठाय मृद्वी सभा श्रभ्रवत्याव्यक्तरसजला सर्वतोऽसार वृक्षा महापर्वत वृक्ष प्राया श्यामा चाकाशगुण भूयिष्ठा।। (Su.Su. 36/4)

Sr. No.	Mahabhuta Predominace Soil	Properties
1.	Prithvi	Rocky, Hard, Heavy and dark/ Dusky Color
2.	Jala	Soft, white in color, moist, cool and suitable for growing soft grains.
3.	Agni	Pale in color, containing stones and supports the growth of small tree.
4.	Vayu	Dry, ash or greyish hue color and supports trees with minimal sap.
5.	Akasha	Soft, has pits and dark color.

तत्र पृथिव्यम्बुगुणभूयिष्ठायां भूमौ जातानि विरेचनद्रव्याण्याददीत।
अग्न्याकाशमारुतगुणभूयिष्ठायां वमनद्रव्याणि।
उभयगुणभूयिष्ठायामुभयतोभागानि।
आकाशगुणभूयिष्ठायां संशमनानि एवं बलवत्तराणि भवन्ति।

(Su.Su. 36/6)

Sr. No.	Mahabhuta Predominace Soil	Karma
1.	Prithvi, Jala	Virechana
2.	Agni, Akasha, Vayu	Vamana
3.	All	Ubhayaja (Virechan and Vamana)
4.	Akasha	Shamana

e. Place from where Drugs should not be Collected

The soil in which medicinal plants are grown plays a crucial role in determining their suitability for therapeutic use. Certain types of soil are considered inappropriate due to potential contamination, lack of nutrients, or negative impacts on the plants' medicinal properties:

वल्मीक-कुत्सित-अनूप-श्मशान-ऊषर-मार्गजाः।
जन्तुवह्निहिमव्याप्ता नौषध्यः कार्यसिद्धिदाः।।

(Sha.Sa.Pu.Kh. 1/66)

1. **Valmika (Anthill Soil)**: Soil around anthills is porous and often contains insect remains and waste, rendering it impure and unsuitable for medicinal plants.
2. **Kutsita (Polluted or Disgusting Places)**: Plants from areas contaminated with waste or foul substances are considered unclean and are not used in medicine.
3. **Anupa (Marshy Land)**: Marshy soil is waterlogged and rich in decaying organic matter, making it prone to harmful microorganisms, thus unsuitable for medicinal purposes.
4. **Shmashana (Burial Grounds)**: Soil from cremation or burial grounds may contain ashes, bones, or other remains, leading to potential contamination and impurity.
5. **Usara Pradesha (Saline Soil)**: Saline or alkali soils have high salt content and lack essential nutrients, making them inappropriate for growing medicinal plants.
6. **Marga (Walking Lanes)**: Plants growing along roadsides or paths are exposed to dust, pollution, and physical damage, leading to contamination and reduced potency.
7. **Jantu Pidita (Soil Spoiled by Insects)**: Soil infested by insects may contain waste, eggs, or toxins that can affect the medicinal quality of the plants.
8. **Agnidagdha (Soil Burned by Fire)**: Soil that has been burned by fire may be nutrient-depleted and contaminated with ash or toxins, making it unfit for medicinal use.
9. **Himavyapta (Soil Covered by Snow or Frost)**: Snow or frost-covered soil is cold and heavy, which can hinder healthy plant growth and alter therapeutic qualities.

देवतालय-वल्मीक-कूप-रथ्याश्मशानजाः।
जलाग्निक्रिमिसंक्षुण्णा ओषध्यस्तु न सिद्धिदाः।।
अकालतरुमूलोत्था न्यूनाधिकचिरन्तनाः।।

(Vai.P.Pra.Kh. 1/67)

1. **Plants grown near temples or anthills**: These plants might be exposed to spiritual, environmental, or ecological influences that could alter their therapeutic properties.
2. **Plants near Kupa (wells) or rathya (roadsides)**: Proximity to these areas may expose plants to pollutants such as chemicals, dust, or runoff, compromising their purity and medicinal quality.
3. **Plants from graveyards**: Such plants may carry negative energy or be exposed to substances that are unsuitable for medicinal purposes.
4. **Plants grown in inappropriate seasons**: The medicinal properties of plants often depend on the season. Harvesting plants at the wrong time can reduce their potency or alter their qualities.
5. **Plants grown from the roots of another plant**: These plants may lack the full range of therapeutic qualities that an independently grown plant would possess.
6. **Poorly grown or excessively grown plants**: Stunted or overgrown plants may indicate poor health, nutritional deficiencies, or exposure to adverse conditions.
7. **Newly grown plants**: These may not have developed their full range of therapeutic constituents, making them less potent for medicinal use.
8. **Plants damaged by excess water, fire, or insects**: Such exposure can degrade a plant's phytochemicals, damage its tissues, or introduce toxins.

f. Stage of Drug Collection

The appropriate time for collection, this stage is crucial for ensuring the potency and therapeutic value of medicinal plants. The text advises using freshly collected herbs to retain their maximum efficacy and active ingredients.

नवान्येव हि योज्यानि द्रव्याण्यखिलकर्मसु।
विना विडङ्गकृष्णाभ्यां गुडधान्याज्यमाक्षिकैः।।

(Sha.Sa.Pu.Kh. 1/44)

Sharngdhara Samhita emphasizes the importance of using freshly collected drugs, except for specific substances like Vidanga, Krishna, Guda (jiggery), Dhanya vishesha (grains), Ghee (clarified butter) and Madhu (honey) which are believed to improve in potency over time.

विगन्धेनापरामृष्टमविपन्नं रसादिभिः।
नवं द्रव्यं पुराणं वा ग्राह्यमेवं विनिर्दिशेत्।। (Su.Su. 36/15)

Maharsi Sushruta states that whether a drug is new (nava) or old (purana) is not of significant concern. What truly matters is that the intrinsic qualities of the drug—such as its taste (rasa), smell (gandha), and other inherent properties—remain intact and uncompromised.

Ensuring that these properties are not degraded or altered is crucial for maintaining the drug's effectiveness and therapeutic value.

Importance

- **Retain Potency**: Contain maximum active principles and volatile oils.
- **Ensure Efficacy**: Provide optimal therapeutic effects.
- **Ensure Safety**: Fresh herbs are less prone to contamination or toxin buildup that may occur during storage.

g. Rule of Duplication (Dviguna Mana Ganana)

The "rule of duplication," is an important guideline in Ayurvedic formulations. The use of freshly dried drugs ensures that the active constituents of the herbs or substances retain their potency and effectiveness. Freshly collected wet drugs, which are generally more perishable, provide essential moisture and additional therapeutic properties.

शुष्कं नवीनं यद् द्रव्यं योज्यं सकलकर्मसु।
आर्द्रं च द्विगुणं युञ्ज्यादेष सर्वत्र निश्चयः।।

(Sha.Sa.Pu.Kh. 1/46-47)

The rule suggests that for every unit of a dry ingredient, double the amount of the wet ingredient should be used. This ratio helps in achieving the desired consistency and therapeutic effect of the formulation.

Need

This rule is crucial for ensuring that the final product maintains its therapeutic efficacy and intended qualities, such as taste (rasa), potency (virya), and post-digestive effect (vipaka). It also affects the overall texture, stability, and shelf life of the formulation, which are critical for the medicine's effectiveness.

Rationality

1. **Allows for other properties** : Dried drugs are naturally 'guru' (heavy) and gurus, so having this balance in the active ingredient is important. It helps offset the potency by using double up on wet drugs.
2. **Water Content Issue** : Wet drugs contain much water and are heavier so that they weigh the same as but their potency is not improved. This quantity compensates for that.
3. **Medium and Binder**: Wet drugs commonly perform as a medium or binder allowing the body to absorb and assimilate active compounds.
4. **Insulin or Dietary Fiber and Macro-Nutrient** : A high percentage of wet drugs provides a well-balanced composition that complies with the principle of balancing doshas (Vata, Pitta, Kapha).
5. **Ensuring Potency** : If wet and dry drugs were employed in equal proportions, then the concentration of active ingredients present per unit volume would be lowered (as water has no therapeutic value), which will reduce their pharmacological action.

Exception

वासानिम्बपटोलकेतकिबलाकुष्माण्डकेन्दीवरी
वर्षाभूकुटजाश्वगन्धसहितास्ताः पूतिगन्धामृताः।
मांसं नागबला सह्यचरपुरी हिङ्ग्वार्द्रके नित्यशः
ग्राह्यास्तत्क्षणमेव न द्विगुणिता ये चेक्षुजा ता गणाः।।

(Vai.P.Pra.Kh. 50)

Exceptions to the above rule of duplication include certain drugs such as Vasa, Nimba, Patola, Ketaki, Bala, Kushmanda, Shatavari, Punarnava, Kutaja, Ashvagandha, Putigandha, Guduchi, Jatamamsi, Nagabala, Sahachara, Guggulu, Hingu, Ardraka, and Iksuvikara's (such as Guda, Khandasarkara, etc.); all of these drugs are collected fresh (in their wet form) but are not doubled in quantity.

गुडूची कुटजो वासा कूष्माण्डश्च शतावरी।
अश्वगन्धा सहचरी शतपुष्पा प्रसारिणी।।
प्रयोक्तव्याः सदैवार्द्रा द्विगुणा नैव कारयेत्।।

(Sha.Sa.Pu.Kh. 1/45-47)

Exceptions to the above rule include certain drugs such as Guduchi, Kutaja, Vasa, Kushmanda, Shatavari, Ashvagandha, Sahachari, Shatapushpa and Prasarini; all of these are collected fresh (in their wet form) but are not doubled in quantity.

h. Ardra and Shushka Dravya Mana

गुञ्जादिमानमारभ्य यावत्स्यात्कुडवस्थितिः।।
द्रवार्द्रशुष्कद्रव्याणां तावन्मानं समं मतम्।।

प्रस्थादिमानमारभ्य द्विगुणं तद्भ द्रवार्द्रयोः।।
मानं तथा तुलायास्तु द्विगुणं न क्वचित् स्मृतम्।

(Sha.Sa.Pu.Kh. 1/33-35)

Sr. No.	Drug Mana	Sushka Dravya	Aardra Dravya	Drava Dravya
1.	1 Gunja (125 mg) to 1 Kudava (192 gms)	Same	Same	Same
2.	1 Prastha (768 gms) to 1 Tula (4.8 kg)	Same	Double	Double
3.	Tula onwards	Same	Same	Same

i. Dravya Sangraha Vidhi and Dravya Samrakshana

गृहीत्वा चानुरूपगुणवद्भाजनस्थान्यागारेषु प्रागुदग्द्वारेषु निवात-प्रवातैकदेशेषु नित्यपुष्पोपहारबलिकर्मवत्सु, अग्नि-सलिलोप-स्वेद-धूम-रजो-मूषक-चतुष्पदामनभिगमनीयानि स्ववच्छन्नानि शिक्येष्वासज्य स्थापयेत्।। (Ch.K. 1/11)

- The collected drugs should be stored in suitable containers that do not cause any unwanted reactions or alterations in the substance.
- These containers must be placed in storerooms that are secure from all sides, with ventilation provided from a single direction, preferably facing east or north.
- These storerooms should also be sites where auspicious ceremonies, such as the offering of flower garlands and bali karmas, are regularly performed.
- The storage area should be protected from fire, water, humidity, smoke, sand, rats, and other animals.
- Additionally, the containers should be covered with lids and suspended on loops or swings to ensure safety.
- The stored drugs are likely to be further enhanced in potency if their effectiveness is influenced by the excellence of the place (desha), season (kala), properties (guna), and the container (bhajana).

j. Rasa, Guna, Virya, Vipaka, Prabhava

Rasa

"Rasa" refers not only to the object of the gustatory sense perceived by the tongue but also serves as an indicator of a substance's composition, properties, and potential actions. Additionally, the term "Rasa" can denote mercury (Parada), the expressed juice of a plant (Svarasa), and the first of the bodily tissues (Rasa Dhatu).

Types

1. Madhura
2. Amala
3. Lavana
4. Katu
5. Tikta
6. Kashaya

Properties of Rasa

1. **Madhura–** Snigdha, Sita, Guru
2. **Amala–** Snigdha, Ushna, Guru
3. **Lavana–** Snigdha, Ushna, Guru
4. **Katu–** Ruksha, Ushna, Laghu
5. **Tikta–** Ruksha, Sita, Laghu
6. **Kashaya–** Ruksha, Sita, Laghu

Guna

Guna is that which is located in dravya inherently is causative agent and devoid of property and action.

Classification

Gunas are 41 in numbers:

1. Guruvadi Guna- 20
2. Paradi Guna- 10
3. Adhyatmika Guna- 06
4. Vishishta Guna – 05

Virya

The factor responsible for the action of a drug is termed Virya. Despite the mention of eight types of viryas across various texts, they are broadly categorized into two main types: Sita virya (cool potency) and ushna virya (hot potency).

Sr. No.	Virya	Karma
1.	Ushna Virya	Vatahara, Kaphahara, Pittavardhaka, Dipana, Pachana, Dahajanana, Murchchhana, Svedana, Vamana, Virechana, Vilayana, Bhrama, Trisnajanana, Asupaka and Avrishya
2.	Sita Virya	Pittahara, Vata kapha Vardhaka, Prahladana, Vishyandana, Sthirikarana, Prasadana, Kledana, Jivaniya, Sthambhana, Rakta Prasadana and Balya

Vipaka

Vipaka is the end point of a drug metabolism. Vipaka is the post-digestive effect of a substance which greatly affects the pharmacological action of any drug. Pharmacokinetic describes the activity of a drug through your body, once you have swallowed something and it completely gets into your blood stream producing its therapeutic effect. When preparing the drugs, it is very important to appreciate the fact that not only taste but specific

Vipaka attribute of each and every ingredient used for making a formulation has an undeniable contribution in deciding final efficacy as well as therapeutic actions which should be made & intended.

मधुरो लवणाम्लौ च स्निग्धभावात् त्रयो रसाः।
वात-मूत्र-पुरीषाणां प्रायो मोक्षे सुखा मताः।।
कटु-तिक्त-कषायास्तु रूक्षभावात् त्रयो रसाः।
दुःखाय मोक्षे दृश्यन्ते वातविण्मूत्र-रेतसाम्।।
शुक्रहा बद्धविण्मूत्रो विपाको वातलः कटुः।
मधुरः सृष्टविण्मूत्रो विपाकः कफशुक्रलः।।
पित्तकृत् सृष्टविण्मूत्रः पाकोऽम्लः शुक्रनाशनः।
तेषां गुरुः स्यान्मधुरः कटुकाम्लावतोऽन्यथा।। (Ch.Su. 26/59)

Sr. No.	Vipaka	Guna	Dosha Karma	Dhatu Karma	Mala Karma
1.	Madhura	Snigdha, Guru	Vata-pitta hara, Kapha kara.	Dhatu Vriddhi, Shukrala	Shrishta Vinmutra
2.	Amla	Snigdha, Laghu	Vatahara, Pittakara	Shukrahara	Shrishta Vinmutra
3.	Lavana	Ruksha, Laghu	Vatakara, Kaphahara	Shukrahara	Baddha Vinmutra

Prabhava

रस-वीर्य-विपाकानां सामान्यं यत्र लक्ष्यते।
विशेषः कर्मणां चैव प्रभावस्तस्य स स्मृतः।। (Ch.Su. 26/67)

The unique factor responsible for the specific pharmacological action of a drug is termed "Prabhava." As noted by the commentator Chakrapani, Prabhava is regarded as "achintya," which translates to unpredictable or beyond rational analysis. This is because its effects cannot be solely attributed to the commonly recognized properties of the drug, such as its taste (rasa), inherent qualities (guna), potency (virya), or post-digestive effect (vipaka).

e.g. - Danti and Chitraka both possess katu rasa (pungent taste), katu vipaka (pungent post-digestive effect), and ushna virya (hot potency). Despite these similarities, Danti acts as a Rechaka (a laxative, promoting bowel movements), while Chitraka acts as a Sangrahi (an astringent, promoting the retention or absorption of fluids).

Anukta Visheshokta Grahana

The term "Anukta Visheshokta Grahana" refers to the interpretation of references that are not explicitly stated (Anukta) or are vaguely mentioned (Visheshokta) in classical texts. This concept is crucial in the formulation, where practitioners need to understand and apply knowledge that may not be directly spelled out in classical texts but can be inferred based on principles.

Anukta (Unstated): These are aspects or details not directly mentioned in the classical texts. For example, specific ingredients or procedures might not be listed explicitly, but their inclusion can be inferred from the context or general principles.

Visheshokta (Vaguely Mentioned): These are references that are mentioned but not in detail. For instance, a certain herb may be recommended for a condition, but its dosage, preparation, or form might not be specified.

Grahana (Understanding/Interpretation): This refers to the practitioner's ability to interpret and understand these unstated or vaguely mentioned aspects correctly. It requires deep knowledge of principles, experience, and a nuanced understanding of the texts.

कालेऽनुक्ते प्रभातं स्याद्भेऽनुक्ते जटा भवेत्।।
भागेऽनुक्ते तु साम्यं स्यात्पात्रेऽनुक्ते च मृन्मयम्।
द्रवेऽनुक्ते जलं ग्राह्यं तैलेऽनुक्ते तिलोद्भवम्।।

(Sha.Sa.Pu.Kh. 1/47-48)

Sr. No.	Unspecified	To be considered
1.	Kala	Prabhata Kala
2.	Anga	Jata
3.	Bhaga	Samaya Bhaga
4.	Patra	Mrita Patra
5.	Drava	Jala
6.	Taila	Tila Taila

चूर्णस्नेहासवा लेहः प्रायशश्चन्दनान्विताः।।
कषायलेपयोः प्रायो युज्यते रक्तचन्दनम्।(Sha.Sa.Pu.Kh.1/53)

Sr. No.	Types of Chandan	Preparation
1.	Shweta Chandana	Churna, Sneha, Asvarishta, Avaleha
2.	Rakta Chandana	Panchavidha Kashya kalpana and Lepa Kalpana

अतिस्थूलजटा याः स्युस्तासां ग्राह्यास्त्वचो बुधैः।।
गृह्णीयात् सूक्ष्ममूलानि सकलान्यपि बुद्धिमान्।

न्यग्रोधादेस्त्वचो ग्राह्याः सारः स्याद्बीजकादितः।।
तालीसादेश्च पत्राणि फलं स्यात् त्रिफलादितः।
धातक्यादेश्च पुष्पाणि स्नुह्यादेः क्षीरमाहरेत्।।

(Sha.Sa.Pu.Kh.1/68-70)

Sr. No.	In case of	To be Taken
1.	Atishula Jata	Tvaka (Bark)
2.	Sukshma Jata	Whole plant
3.	Nyagrodha	Tvaka (Bark)
4.	Bijaka	Sara (Heart wood)
5.	Talisha	Patra (Leaves)
6.	Triphala (Amalaki, Haritaki, Bibhitaki)	Phala (Fruit)
7.	Dhataki	Pushpa (Flower)
8.	Snuhi	Kshira (Milky exudate/ Latex)

Aushadha Namakarana

Namakarana, or naming medicinal preparations, ensures clear identity, reflects key ingredients and actions, and guides proper use.

यदौषधन्तु प्रथमं यस्य योगस्य कथ्यते।
तन्नाम्नैव स योगो हि कथ्यते अत्र निश्चयः।।

(Vai.P.Pra., Pra.Kha. 1/47)

The preparation of a medicinal formulation is first described by its name. Therefore, the name itself signifies the nature and purpose of the formulation, and this naming is decisive in understanding the preparation.

1. **Depend upon name of the discoverer**
   a. Agastya- Haritaki Rasayana
   b. Chyavanprasha Avaleha
   c. Lavana Bhaskara Churna
2. **Depend upon on the drug of the compound**
   a. Abhayadhi Modaka
   b. Rasnasapaka Kvatha
   c. Draksharishta
3. **Depend upon number of ingredients of drugs used**
   a. Punarnavastaka Kvatha
   b. Dadimastaka Churna
   c. Dasanga Lepa
4. **Depend upon on the important ingredient of the preparation**
   a. Hingavashtaka Churna
   b. Arjunarishta
5. **Depend upon on the dose of preparation**
   a. Shadbindu Taila
   b. Ashta Katvara Taila
   c. Kshira Shat Pala Ghrita
6. **Depend upon on the therapeutic effect**
   a. Arshoghana Vati
   b. Arogyavardhini Vati
   c. Phalatrikadhi Kvatha
7. **Depend upon on the menthod of preparation**
   a. Satadhauta Ghrita
   b. Gandhaka Dhruti
8. **Depend upon on the weapon of God**
   a. Sudarshana Churna
   b. Grahani Gajendra Rasa
9. **Depend upon the appearance**
   a. Parpati
   b. Rasa manikya
   c. Pinda Taila
10. **Depend upon the season (Collection Timimg)**
    a. Pushyanaga Churna
11. **Depend upon on the prabhava**
    a. Chandraprabha Gutika
    b. Gangadhara Churna

Aushadha Sevana Kala

The pharmacokinetics of aushadha are influenced by the body's biological rhythm. Therefore, to achieve maximum health benefits, aushadha must be administered at the appropriate time based on factors such as the patient's disease, strength, and age. This optimal time for aushadha administration is known as "Bheshaja Kala" or "Aushadha Sevana Kala" or "Aushadha Apeksha Kala."

Various Ayurvedic texts mention different periods for administering aushadha. Ashtanga Sangraha lists eleven, while Charaka, Sushruta, Ashtanga Hridaya, and Kashyapa mention ten. Sharngadhara, on the other hand, identifies five suitable periods for aushadha administration. These periods are essential considerations for maximizing the efficacy of treatment and ensuring the desired therapeutic outcomes.

According to Archarya Charaka

भैषज्यकालो भुक्तादौ मध्ये पश्चान्मुहुर्मुहुः।
सामुद्गं भक्तसंयुक्तं ग्रासग्रासान्तरे दश।।
अपाने विगुणे पूर्वं समाने मध्यभोजनम्।
व्याने तु प्रातरशितमुदाने भोजनोत्तरम्।।

वायौ प्राणे प्रदुष्टे तु ग्रासग्रासान्तरिष्यते।
श्वासकासपिपासु त्ववचार्यं मुहुर्मुहुः।।
सामुद्गं हिक्किने देयं लघुनाऽन्नेन संयुतम्।
सम्भोज्यं त्वौषधं भोज्यैर्विचित्रैररुचौ हितम्।।

(Ch.Chi. 30/298-301)

Sr. No.	Aushadha Kala		Indication
1.	Bhuktadau -1	Early morning on empty stomach	Apana Vata Vikriti
2.	Bhuktadau -2	Before food	Samana Vata Vikriti
3.	Madhye	In between a single meal	Samana Vata Vikriti
4.	Paschata -1	After morning food	Udana Vata Vikriti
5.	Paschata -2	After evening food	–
6.	Muhurmuhuh	Frequently	Prana Vata Vikriti
7.	Samudga	Before and after food	–
8.	Bhaktasamyukta	Along with food	Shvasa, Kasa, Pipasa
9.	Grasa	Along with each bolus of the food	Hikka with Laghu Anna
10.	Grasantara	In between 2 bolus	Aruchi

According to Sushruta

तत्राभक्तं प्राग्भक्तम् अधोभक्तं मध्येभक्तम् अन्तराभक्तं सभक्तं सामुद्गं मुहुर्मुहुः ग्रासं ग्रासान्तरं च इति दशौषधकालाः।।

(Su.U. 64/65)

Sr. No.	Aushadha Kala	
1.	Abhakta	Without food
2.	Pragbhakta	Before food
3.	Madhyabhakta	In between a meal
4.	Adhobhakta	After food
5.	Sabhakta	Mixed along with the food
6.	Antarabhakta	In between 2 meals
7.	Samudga	Before and after food
8.	Muhurmuhuh	Again and again (frequently)
9.	Sagrasa	Along with each bolus of food
10.	Grasantara	In between two bolus

According to Vagbhata

अभक्तं प्राग्भक्तं मध्यभक्तम् अधोभक्तं समभक्तम् अन्तराभक्तं सामुद्गं मुहुर्मुहुः सग्रासं ग्रासान्तरं निशि च।।

(A.San.Su. 23/12)

Sr. No.	Aushadha Kala	
1.	Abhakta	Without food
2.	Pragbhakta	Before food
3.	Madhyabhakta	In between a meal
4.	Adhobhakta	After food
5.	Sabhakta	Mixed along with the food
6.	Antarabhakta	In between two meals
7.	Samudga	Before and after food
8.	Muhurmuhuh	Again and again
9.	Sagrasa	Along with each bolus of the food
10.	Grasantara	In between 2 bolus
11.	Nishi	Night at bed time

According to Sharngadhara

ज्ञेयः पञ्चविधः कालो भैषज्यग्रहणे नृणाम्।
किञ्चित्सूर्योदये जाते तथा दिवसभोजने।।
सायन्तने भोजने च मुहुश्चापि तथा निशि।
प्रायः पित्त कफोद्रेके विरेकवमनार्थयोः।।
लेखनार्थं च भैषज्यं प्रभाते तत्समाहरेत्।
एवं स्यात्प्रथमः कालो भैषज्यग्रहणे नृणाम्।।
भैषज्यं विगुणेऽपाने भोजनाग्रे प्रशस्यते।
अरुचौ चित्रभोज्यैश्च मिश्रं रुचिरमाहरेत्।।
समानवाते विगुणे मन्देऽग्नावग्निद्वीपनम्।
दद्यादभोजनमध्ये च भैषज्यां कुशलो भिषक्।।
व्यानकोपे च भैषज्यं भोजनान्ते समाहरेत्।
हिक्काऽऽक्षेपक कम्पेषु पूर्वमन्ते च भोजनात्।।
एवं द्वितीयकालश्च प्रोक्तो भैषज्यकर्मणि।
उदाने कुपिते वाते स्वरभङ्गादिकारिणी।
ग्रासे ग्रासन्तरे देयं भैषज्यं सान्ध्यभोजने।
प्राणे प्रदुष्टे सान्ध्यस्य भुक्तस्यान्ते च दीयते।।
औषधं प्रायशो धीरैः कालोऽयं स्यात्तृतीयकः।

मुहुर्मुहुश्च तृट्छर्दि हिक्का श्वासगरेषु च।
सान्नं च भेषजं दद्यादिति कालश्चतुर्थकः।।
ऊर्ध्वजत्रुविकारेषु लेखने बृंहणे तथा।।
पाचनं शमनं देयमन्नं भेषजं निशि।
इति पञ्चमकालः स्यात् प्रोक्तो भैषज्यकर्मणि।।

(Sha.Sa.Pu.Kh. 2/2-12)

Sr. No.	Aushadha Kala		Indication
1.	Suryodaya	At sun rise time	Virechana, Vamana
2.	Divasabhojana	During day meals	a. Bhojanagra- Apana Vata Vikriti b. Bhojana Madhya- Samana Vata Vikriti c. Bhojanamte- Vyan Vata Vikriti
3.	Sayantane	Evening times	a. Grasantra Udana Kopita and Svarabhanga b. Bhojananta- Prana Vata Dushti
4.	Muhurmuhuh	Repeatedly	Trishana, Chardi, Hikka, Shwasa Roga.
5.	Nishi	At bed time	Urdhva Jatrugata Vikara, Lekhana, Brinhara, Pachana and Shamana.

Chronotherapeutics

1. It refers to the science of timing drug administration to optimize treatment outcomes based on the body's natural biological rhythms.
2. This approach acknowledges that various physiological processes, such as metabolism, hormone levels, and organ function, follow circadian rhythms, which can influence the absorption, distribution, metabolism, and elimination of drugs.
3. By aligning drug administration with these rhythms, chronotherapeutics aims to enhance therapeutic efficacy, minimize side effects, and improve patient compliance.
4. This field is particularly relevant in conditions where disease symptoms or drug responses vary throughout the day, such as in asthma, hypertension, and cancer.
5. Chronotherapeutics emphasizes the importance of personalized medicine and considers factors such as the patient's age, sex, lifestyle, and disease status when determining optimal dosing schedules.

Saviryata Avadhi

The term "Saviryata Avadhi" comes from two Sanskrit words: "Savirya" meaning "Potency" and "Avadhi" meaning "Duration." Thus, it denotes the time frame within which the medicine or preparation is expected to maintain its therapeutic properties without degradation or loss of effectiveness.

Factors Influencing Saviryata Avadhi

1. **Type of Formulation**: Different types of formulations have varying shelf lives based on their composition, preparation methods, and storage requirements, such as: Churna (powders), Kvatha (decoctions), Asava and Arishta (fermented preparations), Ghrita & Taila (medicated ghee and oils).
2. **Ingredients Used**: The nature of the ingredients, including herbs, minerals, metals, and other components, affects Saviryata Avadhi. Formulations with perishable ingredients like fresh juices or milk derivatives may have shorter shelf lives than those with dried herbs or minerals.
3. **Method of Preparation**: Traditional preparation methods such as boiling, fermentation, and distillation play a crucial role in determining shelf life. For example, fermentation (used in Asava and Arishta) naturally preserves the formulation, enhancing its longevity.
4. **Storage Conditions**: The environment where the formulation is stored—including temperature, humidity, light exposure, and air contact—significantly impacts its longevity. Storing medicines in airtight containers, away from direct sunlight, moisture, and extreme temperatures to extend their shelf life.
5. **Packaging Material**: The type of packaging material (glass, plastic, metal) can affect the formulation's shelf life. Glass containers are often preferred for their non-reactive and impermeable nature, which helps preserve the potency of the formulation.

Importance of Saviryata Avadhi

1. **Ensures Therapeutic Efficacy**: Knowing the Saviryata Avadhi helps ensure that formulations are consumed when they are most potent and

effective, providing the intended therapeutic benefits.

2. **Prevents Adverse Effects**: Using formulations beyond their recommended shelf life may reduce effectiveness or even cause adverse reactions due to the degradation of active ingredients.
3. **Maintains Quality Control**: Determining and adhering to Saviryata Avadhi is vital for maintaining the quality, safety, and consistency of Ayurvedic products.
4. **Guides Practitioners and Patients**: Practitioners can provide accurate instructions to patients about the appropriate time frame for using specific formulations, ensuring optimal health outcomes.

गुणहीनं भवेद् वर्षादूर्ध्वं तदूपमौषधम्।।
मासद्वयात् तथा चूर्णं हीनवीर्यत्वमाप्नुयात्।।
हीनत्वं गुटिकालेहौ लभेते वत्सरात्परम्।।
हीनाः स्युः घृततैलाद्याश्चतुर्मासाधिकात् तथा।
औषध्यो लघुपाकाः स्युर्निर्वीर्या वत्सरात्परम्।।
पुराणाः स्युर्गुणैर्युक्ता आसवा धातवो रसाः।

(Sha.Sa.Pu.Kh. 1/54-56)

Sr. No.	Kalpana	Saviryata Avadhi
1.	Churna Kalpana	2 months
2.	Gutika/ Vati	1 year
3.	Avaleha	1 year
4.	Sneha Kalpana (Ghrita/ Taila)	16 months
5.	Laghupaki	1 year
6.	Asavarishta	Infinite
7.	Dhatu Bhasma	Infinite
8.	Rasaushadhi	Infinite

क्वाथस्य कल्कस्य रसस्य यामं मास त्रयं चाञ्जन चूर्ण वीर्यम्।
षण्मासवीर्यं गुडलेहयोश्च संवत्सरं तैलकृतस्य वीर्यम्।।

(Yo.Ra.Jva.Chi.Au. 4)

Sr. No.	Kalpana	Saviryata Avadhi
1.	Swarasa	3 hours
2.	Kalka	3 hours
3.	Kvatha	3 hours
4.	Anjana	3 months
5.	Churana	3 months
6.	Guda	6 months
7.	Avaleha	6 months
8.	Ghrita/ Taila	12 months

Shelf life is the duration during which a product remains usable, effective, and safe to consume or use, maintaining its intended quality under specified storage conditions.

Regulatory Guidelines

The shelf life of Ayurvedic formulations is regulated by the Drugs and Cosmetics Act (1940) and the Drugs and Cosmetics Rules (1945) in India. The Ministry of AYUSH specifies guidelines for the shelf life of various formulations to help manufacturers maintain quality standards and ensure consumer safety.

According to Gazzet of Governament of India 2016 Shelf life of Ayurvedic Dosages Forms are as follows:

Sr. No.	Dosage Form	Shelf life
1.	Churna	2 years
2.	Kvatha Churna	2 years
3.	Gutika/ Vati with Kasthaushadhi	3 years
4.	Rasa Aushadis	10 years
5.	Asava- Arishta	10 years
6.	Avaleha	3 years
7.	Guggulu	5 years
8.	Mandura Lauha	10 years
9.	Ghrita	2 years
10.	Taila	3 years
11.	Arka	1 years
12.	Dravaka Lavana	5 years
13.	Kshara	2 years
14.	Lepa Churna	2 years
15.	Danta Manjana Powder and Paste	2 years
16.	Lepa Gutika	5 years
17.	Lepa Malhar, Lotion, Gel, Cream	3 years
18.	Varti	2 years
19.	Ghana Vati	5 years
20.	Kupipakva Rasayana	10 years
21.	Parpati	10 years
22.	Shveta Parpati	2 years
23.	Pishti & Bhasma	10 years
24.	Svarna, Rajata, Godanti etc.	10 years
25.	Naga Bhasma, Vanga Bhasma, Tamra Bhasma	5 years
26.	Capsules containing Kasthaushadi	3 years
27.	Capsules containing Rasa Bhasma	3 years
28.	Syrups	3 years
29.	Nasal Drop	2 years
30.	Khanda/ Grannules/ Paaka	2 years
31.	Dhupanas- inhallers	2 years
32.	Pravahi Kvatha with preservatives	3 years
33.	Anjana–	
	a. With Kashthaushadhi	1 year
	b. With Kashthaushadhi, Rasa, Uparasa	2 years
	c. Only Bhasma	3 years
34.	Gutika/ Vati–	
	a. Containing Kashthaushadhi with Rasa/ Uparasa bhasma/Guggulu	5 years 3 years 10 years
	b. Only Kashthaushadhi	
	c. Only rasa, except Naga, Vanga and Tamra	
35.	Rasayoga–	
	a. Only Rasa/ Uparasa/ Bhasma except Naga/ Vanga and Tamra	10 years 5 years
	b. Rasa/ Uparasa/ Bhasma with Kashthaushadhi/ Guggulu	
36.	Sattva	2 years
37.	Shakara/ Panaka/ Sharbata	3 years

Aushadha Matra

"Matra" denotes a measure of various factors such as quantity, size, duration, number, or degree. In Ayurveda, consideration of dosha is crucial to achieve the desired therapeutic outcome. If the dose is excessive, it can lead to harmful side effects, while an insufficient dose may prove ineffective. Therefore, dosage should be carefully regulated to ensure that the drug produces the desired effects without harming the tissues. The determination of dosage should take into account both the condition of the disease and the individual characteristics of the patient.

स्थितिर्नास्त्येव मात्रायाः कालमग्निं वयो बलम्।।
प्रकृतिं दोषदेशौ च दृष्ट्वा मात्रां प्रकल्पयेत्।

(Sha.Sa.Pu.Kh. 1/37-38)

The prescription of medicine does not adhere to a fixed dose applicable universally to all patients. Instead, the dosage varies based on several factors:

1. **Kala (Time)**: This includes considerations such as the season when the drug is administered.
2. **Agni (Digestive Power)**: The patient's ability to digest influences dosage.
3. **Vayas (Age)**: Dosage may differ based on the patient's age.
4. **Bala (Strength)**: The patient's overall strength and vitality are taken into account.
5. **Prakriti (Constitution)**: The individual's physical constitution is considered.
6. **Dosha (Nature of Dosha)**: The specific nature of the dosha involved in causing the disease.
7. **Desha (Habitat)**: The patient's habitat or geographical location is also a factor.

बालस्य प्रथमे मासि देया भेषजरक्तिका।।
अवलेहीकृतैकैव क्षीरक्षौद्रसिताघृतैः।
वर्धयेत्तावदेकैकां यावद् भवति वत्सरः।।
मासैर्वृद्धिस्तदूर्ध्वं स्याद्यावत्षोडशवत्सरः।
ततः स्थिरा भवेत्तावद्यावद्वर्षाणि सप्ततिः।।
ततो बालकवन्मात्रा ह्रासनीया शनैः शनैः।
मात्रेयं कल्कचूर्णानां कषायाणां चतुर्गुणा।।

(Sha.Sa.Pu.Kh. 6/49-52)

Sr. No.	Vaya (Age)	Matra (Dose)
1.	1 month	1 Ratti (125 mg)
2.	2 months	2 Ratti (250 mg)
3.	3 months	3 Ratti (375 mg)
4.	4 months	4 Ratti (500 mg)
5.	5 months	5 Ratti (625 mg)
6.	6 months	6 Ratti (750 mg)
7.	7 months	7 Ratti (875 mg)
8.	8 months	8 Ratti (1000 mg)
9.	9 months	9 Ratti (1125 mg)
10.	10 months	10 Ratti (1250 mg)
11.	11 months	11 Ratti (1375 mg)
12.	12 months/ 1 year	12 Ratti (1500 mg)
13.	2 years	12 Ratti + 1 Masha (2.5 gms)
14.	3 years	12 Ratti + 2 Masha (3.5 gms)
15.	4 years	12 Ratti + 3 Masha (4.5 gms)
16.	5 years	12 Ratti + 4 Masha (5.5 gms)
17.	6 years	12 Ratti + 5 Masha (6.5 gms)
18.	7 years	12 Ratti + 6 Masha (7.5 gms)
19.	8 years	12 Ratti + 8 Masha (8.5 gms)
20.	9 years	12 Ratti + 9 Masha (9.5 gms)
21.	10 years	12 Ratti + 10 Masha (10.5 gms)
22.	11 years	12 Ratti + 11 Masha (11.5 gms)
23.	12 years	12 Ratti + 12 Masha (12.5 gms)
24.	13 years	12 Ratti + 13 Masha (13.5 gms)
25.	14 years	12 Ratti + 14 Masha (14.5 gms)
26.	15 years	12 Ratti + 15 Masha (15.5 gms)
27.	16 years 70 years	12 Ratti + 16 Masha (16.5 gms)
28.	71 years	12 Ratti + 14 Masha (15.5 gms)
29.	72 years	12 Ratti +13 Masha (14.5 gms)
30.	73 years	12 Ratti + 12 Masha (13.5 gms)
31.	74 years	12 Ratti + 11 Masha (12.5 gms)

Sr. No.	Vaya (Age)	Matra (Dose)
32.	75 years	12 Ratti + 10 Masha (11.5 gms)
33.	76 years	12 Ratti + 9 Masha (10.5 gms)
34.	77 years	12 Ratti + 8 Masha (9.5 gms)
35.	78 years	12 Ratti + 7 Masha (8.5 gms)
36.	79 years	12 Ratti + 6 Masha (7.5 gms)

तत्र मासादूर्ध्वं क्षीरपायाङ्गुलिपर्वद्वयग्रहणसंमितामौषधमात्रां विदध्यात्, कोलास्थिसंमितां कल्कमात्रां क्षीरान्नादाय, कोलसंमितामन्नादायेति।। (Su.Sha. 10/43)

- After a month, the dosage of the medicine should be equivalent to the distance between two finger joints (about the width of one finger).
- The amount of Kalka should match the size of a bone joint (Kalasthi).
- The quantity of food mixed with milk should correspond to the size of a "Kola" (a small berry or plum).

According to Acharya Kashyapa

The dosage recommendation by Kashyapa in the Khila Sthana suggests starting with a dose equivalent to the size of a vidanga fruit for a newborn child. As the child grows, the dosage is gradually increased, but it should not exceed the size of an Amalaki fruit. Here is the detailed dosage schedule based on the child's age:

Sr. No.	Vaya (Age)	Matra (Dose)
1.	New Born	Vidanga Phala
2.	After a few months	Gradually increase
3.	Older infants	Not Excees Amalaki Phala

Physicians determine a suitable dose of medicine by considering these factors. There is no universally applicable dosage for everyone. Instead, the dosage of medicine is individualized based on factors such as time, digestive capacity, age, strength, constitution, dosha, and habitat.

Sharngadhara has proposed dosages based on age and preparations. According to his recommendations, for a one-month-old child, the dosage should be one ratti (125 mg), administered as a confection with milk, honey, sugar, and ghee. The dosage increases gradually at the rate of one ratti per month up to one year of age. Afterward, the dosage increment continues up to the age of seventy, and then gradually decreases in a regressive manner.

This dosage regimen applies to both powders and pastes, whereas for decoctions, the dosage should be four times the specified amount.

Posology

- Posology is the branch of pharmacology that deals with the study of dosages and doses of medicines, as well as the factors influencing their administration.
- It involves determining the appropriate dosage of a drug for a particular patient based on various factors such as age, weight, gender, health status, and the severity of the condition being treated.
- Posology aims to ensure the safe and effective use of medications by providing guidelines for dosage regimens that optimize therapeutic outcomes while minimizing the risk of adverse effects.
- Calculating the dosage of medication based on age involves considering several factors such as the developmental stage of the individual, their metabolism, and their response to the medication.

How dosage may be calculated according to age

1. **Infants and Newborns**: Dosage for infants and newborns is typically based on their weight rather than their age. Pediatricians often use weight-based dosing charts to calculate the appropriate dosage for medications:
   - Young Rule
   - Dilling Rule
2. **Children**: As children grow older, their dosage may be adjusted based on age and weight. Pediatric dosing guidelines take into account the child's age, weight, and sometimes body surface area to determine the appropriate dose.
3. **Adolescents**: Adolescents may require dosages similar to adults, but adjustments may still be made based on factors such as weight, developmental stage, and metabolism.
4. **Adults**: For adults, dosages are typically standardized based on average body weight and are often not adjusted solely based on age. However, individual factors such as liver or kidney function may still influence dosing.
5. **Elderly**: Elderly individuals may require lower dosages due to changes in metabolism, reduced

organ function, and increased sensitivity to medications. Renal and hepatic function should be considered when calculating dosages for this population.

It's essential to follow dosage guidelines provided by healthcare professionals or medication labels, as incorrect dosing can lead to adverse effects or reduced efficacy of the medication. Always consult with a healthcare provider for personalized dosage recommendations tailored to individual needs and circumstances.

Anupana

Anupana refers to a substance or vehicle used as a medium to administer medicine. It plays a crucial role in enhancing the efficacy and absorption of the medicine, as well as mitigating any potential side effects. Anupanas can vary widely and may include water, milk, honey, ghee (clarified butter), juice, or specific herbal decoctions. The choice of anupana depends on factors such as the patient's constitution, the nature of the medicine, the desired therapeutic effect, and the doshic imbalance being addressed. Additionally, anupanas may also be selected based on taste, temperature, and other sensory properties to optimize the overall therapeutic experience and promote healing.

Anupana Definitions

अनु पश्चात् पीयते इति अनुपानम्।। (Shabdakalpadrum)
अनु पश्चात् वा अनु साकं पीयते इति अनुपानम्।
(Ch.Su. 27/319; Chakra.)

अन्नाद् अनु पश्चात् पीयते इति अनुपानम्।
(Su.Su. 46/419; Dalhan)

अनुपानम् इति अनु पश्चात् पानम् तत्।
(Sha.S.M.Kh. 8/4; Adhamalla)

अनु सह पश्चात् पीयते इति अनुपानम्।। (Dravyaguna vol.I)

Significance of Anupana

यथा तैलं जले क्षिप्तं क्षणेनैव प्रसर्पति।
अनुपानबलादङ्गे तथा सर्पति भेषजम्।। (Sha.S.M.Kh. 6/5)

Sharngadhara compares anupana to oil on water, illustrating its role in facilitating rapid absorption and assimilation of medicine.

स्थिरतां गतमक्लिन्नमन्नमद्रवपायिनः।
भवत्याबाधजनकमनुपानमतः पिबेत्।।
(Vai.P.Pra.Tri.Kh. 82)

Insufficient water consumption during meals can lead to dryness in the food, which affects its texture and moisture content. When food lacks moisture, it becomes harder to chew and swallow, which can slow down the digestive process. Proper digestion relies on the food being adequately moistened by saliva and gastric juices, allowing enzymes to break it down efficiently. Without sufficient moisture, this process becomes less effective, potentially leading to indigestion, discomfort, and nutrient malabsorption. Therefore, it's important to drink water regularly during meals to ensure that food remains moist and facilitates optimal digestion.

Benefits

रोचनं बृंहणं वृष्यं दोषघ्नं वातभेदनम्।
तर्पणं मार्दवकरं श्रमक्लमहरं परम्।। (Vai.P.Pra.Tri.Kh. 3/84)

1. **रोचनं (Rochanam):** Enhances appetite or increases taste perception. It also implies improving digestion by stimulating the secretion of digestive juices.
2. **बृंहणं (Brishanam)**: Nourishing or promoting growth, especially of body tissues (Dhatus). It suggests an anabolic effect, enhancing body mass and strength.
3. **वृष्यं (Vrishyam):** Aphrodisiac in nature, enhancing sexual potency and vitality.
4. **दोषघ्नं (Doshaghnam)**: Balances or pacifies the Doshas (Vata, Pitta, and Kapha), which are the fundamental biological energies in Ayurveda.
5. **वातभेदनं (Vatabhedanam)**: Specifically counteracts or alleviates Vata-related disorders, including pain, stiffness, and other symptoms associated with Vata imbalance.
6. **तर्पणं (Tarpanam)**: Nourishing or satisfying, particularly in the context of providing deep nourishment and rejuvenation to tissues.
7. **श्रमक्लमहरं (Shramaklamaharam)**: Removes or alleviates fatigue and exhaustion, both physical and mental.

Shreshtha Anupana

सर्वेषामनुपानानां माहेन्द्रं तोयमुत्तमम्। (Su.Su. 46/434)

Rainwater is considered the best anupana according to many classical references; however, it should be collected before it touches the ground and used immediately after collection.

Indications

स्निग्धोष्णं मारुते शस्तं पित्ते मधुरशीतलम्।
कफेऽनुपानं रूक्षोष्णं क्षये मांसरसं पयः।।
(Vai.P.Pra.Tri.Kh. 3/87)

Sr. No.	Roga	Anupana
1.	Vata Roga	Snigdha and Ushna
2.	Pitta Roga	Madhura and itala
3.	Kapha Roga	Ruksha and Ushna
4.	Kshaya Roga	Mamsa Rasa

भल्लाततौवरे स्नेहे शीतमेव जलं पिबेत्।
जलमुष्णं घृते पेयं यूषस्तैलेऽनुशस्यते।
वसामज्जोऽस्तु मण्डः स्यात् सर्वेषूष्णमथाम्बु वा।।
यूषो मांसरसो वाऽपि शालिमुद्गादिभोजिनाम्।
मांसादीनां चानुपानं धान्याम्लं दधिमस्तु वा।।
(Vai.P.Pra.Tri.Kh. 89,91)

Sr. No.	Dravya Sevana	Anupana
1.	Bhallataka Sneha	Cold Water
2.	Tuvaraka Sneha	Cold Water
3.	Ghritapana	Warm Water
4.	Tailapana	Yusha
5.	Vasa and Majjapana	Manda
6.	Any type of Sneha	Warm Water
7.	Shali and Mudga	Yusa and Mamsrasa
8.	Mamsa and Mamsarasa	Dhanyamla and Dadhimastu

Contraindications

नोर्ध्वाङ्गमारुताविष्टा न हिक्काश्वासकासिनः।
न गीतभाष्याध्ययनप्रसक्ता नोरसि क्षताः।
पिबेयुरुदकं भुक्त्वा तद्धि कण्ठोरसि स्थितम्।
स्नेहमाहारजं हत्वा भूयो दोषाय कल्पते। (Ch.Su. 27/327-328)

1. Urdhvajatrugata Roga (Diseases of Head and Neck)
2. Hikka (Hiccup)
3. Shvasa (Dyspnoea)
4. Kasa (Cough)
5. गीतभाष्याध्ययन (Prolonged Singing, Speech, and Study)
6. Urahkshata (Conditions like Hydrothorax, Pneumothorax, Pyothorax, etc)

Anupana Matra

अनुपानं प्रयोक्तव्यं व्याधौ श्लेष्मभवे पलम्।
पलद्वयन्त्वनिलजे पित्तजे तु पलत्रयम्।
गुणक्षीद्रसितादीनां पलार्द्धञ्च विशेषतः।।
(Vai.P.Pra.Tri.Kh. 94)

Sr. No.	Roga	In General	In case of Guda, Madhu, Sarkara
1.	Vata Roga	1 Pala (48 ml)	Half Pala (24 gms)
2.	Pitta Roga	2 Pala (96 ml)	1 Pala (48 gms)
3.	Kapha Roga	3 Pala (144 ml)	1.5 Pala (72 gms)

Points to be Noted

Anupana, as defined by classical texts such as those by Acharaya's– Vagbhata, Charaka, Sushruta, and Sharngadhara, is typically regarded as a liquid medium. However, some formulations also recognize the use of solids, like Guda (jaggery) and Sita (sugar), as Anupana, suggesting that it can serve both in liquid and solid forms. In clinical practice, solid Anupanas like Guda are often added to decoctions (Kvatha) as "Prakshepa". On the other hand, formulations such as tablets (Gulika), powders (Churna), and Avaleha are frequently consumed with liquid Anupana like milk, hot water, or buttermilk.

Yougika Dravya Siddhanta

Introduction

Herbal formulations that combine two or more herbs are described as compounds or polyherbal formulations. There are two fundamental principles by which the usage of herbs is guided in Ayurveda:

1. **Single Herb Usage**: Each herb is used separately as in Agrya Prakarana (Ch. Su. 25).
2. **Polyherbal or Compound Formulation**: More than one herb is used together, an example of this is Mahakashaya (Ch. Su. 4).

While single herb formulations are recognized, the active phytoconstituents they contain are often found in low levels, which might not be ideal to attain expected therapeutic responses. When herbs of varying potency are combined, scientific studies suggest that this could deliver a more significant result than if the herb is taken by itself. Since no disease manifests with just a single symptom, and its pathogenic process depends on various key factors, polyherbal formulations are often more effective. The potency of one herb taken by itself is quite different from when used in combination with other herbs that have similar actions.

While herbal compounding is common to many other types of natural medicine, the theory in Ayurveda helps guide which herbs are best combined together. When preparing any herbal compound, some principles always need to be followed.

Need

1. **Imbalance Correction**: Combinations of individual herbs have shown to be effective enough in correcting imbalance when taken individually.
2. **Strength of Illness**: Serious or acute illness often requires a combination of herbs for a stronger effect in treating the condition.
3. **Neutralizing Toxicity**: If an herb has toxic or poisonous side effects, other herbs are combined in the formula to act as an antidote.
4. **Route to Remote Organs**: If the impacted organ is distant from the administration site, specific herbs are included to facilitate targeted intervention.
5. **Flavor Enhancement**: Bitter herbs are blended with sweetening or more flavorful ones to mask the taste of less palatable medicines.
6. **Herbal Moderation**: An herb can balance or reduce its own characteristic by mixing with an opposite effect.
7. **Preventing Side Effects**: An herb may be added to offset the effect of the primary treating herb, such as adding peppermint to senna to prevent cramping.
8. **Prolonging Action**: Additional herbs may be added to the formula if prolongation of action is desired.
9. **Dose and Usage Variability**: Different herbs have different doses and usage, and in some instances, the benefits of both the principal herb and the secondary are desired.

Principle of Compound Formulation

1. **Samanya (Correspondence):** This principle states, "like increases like." It involves imitating the deficient tissue, humor, or function with a substance of similar nature, quality, and/or action. For example, a person with a Vata deficiency is given substances that aggravate Vata (light, dry, and cold) to increase the necessary amount for proper health.
2. **Vishesha (Dissimilarity):** This principle is based on the idea that "opposites balance." If a particular dosha is in excess or unbalanced, substances with opposing qualities are used to decrease it. For instance, if there is an excess of Pitta (hot, sharp, and oily), substances with qualities opposite to the fiery nature, like cooling, soothing, and dry, would be recommended.

Application in Formulation

- **Selection of Ingredients**: Ayurvedic medicine formulation is based on the principles of Samanya and Vishesha. For formulations intended to increase a specific function or tissue, ingredients with similar properties (Samanya) are chosen, such as stimulants for sensation. On the other hand, for pacification or reduction (Vishesha), ingredients with opposite qualities are selected.
- **Example in Practice**: For treating digestive issues where Pitta is aggravated (leading to acidity, inflammation, etc.), an Ayurvedic formulation would include ingredients that cool and soothe the gut, like Shatavari, which neutralizes hyperacidity. These ingredients follow the Vishesha principle to balance the excess Pitta.
- **The Principle in Dosage and Administration**: The principle also applies to the dosage and the way the medicine is administered, aligning with the cycles of doshas to ensure the medicine's effects harmonize with the body's natural rhythms.

This principle exemplifies the personalized and holistic approach of Ayurveda, where treatments are designed based on a detailed understanding of the individual's constitution (Prakriti) and the specific imbalance. The balance between Samanya and Vishesha is foundational in Ayurvedic therapeutic practice.

Literature Review

1. **Contributions of Acharya Charaka:**
   - Acharya Charaka, a great physician, specialized in therapeutics for both internal and external use from herbs.
   - He identified 500 drugs or potential drugs and grouped them into 50 Mahakashayas (major categories) depending on similarity (Karmatmaka Vargikarana).

- The term "Kashaya" refers to a single herb, while a combination of more than one drug is termed "Mahakashaya."
- Charaka opined that physicians should erase the medicines not listed and, based on the condition, add new ones as per requirement. This provides the rationale to mix groups

(Ch.Su. 4/28)

2. **Grouping by Acharya Sushruta**:
   - Acharya Sushruta described a total of 37 Gana (groups of medicinal drugs) in the Salasaradi group, including herbs like Salasara, Ajakarna, Khadira, and Chandana.
   - These herbs are helpful in treating Kushtha (skin diseases), fat-absorbing anabolic compounds from the body or tissues (Meda/Kaphaghna), Meha (oliguria/polyuria), and Pandu (anaemia).
3. **Concept of Polyherbalism by Acharya Sharngadhara**:
   - Acharya Sharngadhara, in his text "Sharngadhara Samhita" (1300 AD), insisted on the use of polyherbal formulations.
   - Ayurveda and the traditional Indian system consider plant extracts or combination extracts superior to individual herbs, pointing to the concept of polyherbalism for therapeutic purposes.

Basic Consideration for the Formulation

1. **Tridosha and Panchamahabhuta Principles:** Ayurvedic formulations are based on the principles of Tridosha (Vata, Pitta & Kapha) & Panchamahabhutas, which means ether, air, fire, water, and earth. It further views that imbalances in the five elements cause disease.
2. **Shadrasa Concept (Six Tastes):** Depending on your body Doshas and Shadrasa (six tastes), the formulation process will be done. Some tastes are found to pacify specific Doshas (Madhura, Amla, and Lavana soothe Vata, for instance).
3. **Incompatibility (Viruddha):** Herbs that are incompatible in polyherbal formulations should not be combined, as it can harm rather than benefit the targeted profile.
4. **Action Incompatibility (Karma Viruddha):** Make sure some actions of the selected herbs are not antagonistic unless balanced, such as symptoms that do not cause effects to counteract each other's benefits (using excessive Guggulu with arsenic).
5. **Samskara (Purification):** Specific processes like Parada, Gandhaka, and Chadhana may be done to remove toxic effects if any from it.
6. **Yojana (Planning):** Plan which can counteract deleterious effects and potentiate the desired effect, e.g., using Shunthi with Nishoth a to prevent tenesmus.
7. **Samyoga (Combining Herbs):** Add several herbs for special reasons, deliberate to accelerate the speed of drug action, apply a facilitator to enter such diuretic effects (e.g., mixing honey and ghee with Panchatrina and Badderapashana). Serve as preservatives (e.g., salt addition). Keep the aroma virtues in good condition or make it tastier (e.g., mix sugar and honey instead of using acidic/shocking spices like Karpura and Ela to increase the dose).
8. **Principle of Synergy:** According to this principle, the herbs which have similar properties are mixed together to increase their overall therapeutic effect. Yoga Samsarga/Mineral Pitch: The primary herb used in one formulation will be supported by secondary herbs with similar properties to enhance the desired action, which is used and practiced in Ayurveda:
   - **Mode of Action:** For instance, when it targets the liver and blood, Guduchi (Tinospora cordifolia) can be used as a lead herb because of its detoxifying and immunomodulatory properties. Neem (Azadirachta indica) and Milk Thistle (Silybum marianum), two supporting herbs, may be included to boost liver-cleansing or blood-purifying effects.
9. **Rule of Accommodating Herbs:** Related Concepts: Supporting herbs address associated or secondary symptoms that are indirectly affected by the main herbs. This is the principle of Anupana in Ayurveda, where assisting herbs support and enhance the main treatment while also treating associated symptoms:
   - In inflammatory skin conditions such as psoriasis, include herbs like Turmeric (Curcuma longa) and Manjishtha (Rubia cordifolia). Using these herbs not only focuses on inflammation and itching but also helps the liver cleanse too (the main organ responsible for purifying blood).
10. **Carrying Herb/Assimilating Herbs:** Herbs, commonly stimulating or carminative in nature, are included to increase the digestion and assimilation of that compound. In an overweight person, very good aged honey that had not been filtered may cause increased weight much more than white sugar. And in Ayurveda, it is crucial for the proper assimilation of nutrients by the force (Agni—digestive fire):
    - Trikatu {a blend of Black Pepper [Piper nigrum], Ginger [Zingiber officinale (a tropical plant)], and Long Pepper [Piper longum]} is normally filled to invigorate the assimilation tracts and film retention. One must be careful taking this tact with heavy, nutritive tonic herbs in larval formulations as they can suppress Agni if not balanced properly.
11. **Principle of Opposition:** Balancing Principle: On which the qualities of a compound are balanced by adding herbs that counteract or moderate its potential adverse effects (Concept). When it comes to Ayurveda, this is called "Pratikarsha" or "Pratyanika," designing a balanced formula by combining two types of herbs.

Examples

- **Cold and Dry Herbs**: When a compound is especially bitter and cold/dry (both of which can impair digestion), add some warming herbs—say Ginger or Cinnamon (Cinnamomum verum) to bring the balance back. Licorice (Glycyrrhiza glabra) is another moistening herb that can be used to prevent dryness.
- **Detoxification**: Herbal purgative medicines such as Triphala (a combination of Amla, Haritaki, and Bibhitaki) are added to remove the toxins (Ama) that have been formed by some herbs via the large intestine & urinary tract.

Yoga Formulation Example

Vashavaleha is a classic Ayurvedic formulation with a well-balanced synergy of ingredients:

1. **Vasa (Adhatoda vasica)**: This is the primary ingredient and is known for its medicinal properties, especially in treating respiratory issues. It helps to balance Kapha and Vata doshas and has expectorant and anti-inflammatory effects.
2. **Pippali (Piper longum)**: Pippali acts as a synergistic agent, enhancing the bioavailability and effectiveness of Vasa. It also helps to balance the digestive system and promotes better absorption of nutrients.
3. **Goghrita (Clarified Butter)**: This ingredient helps to counteract the dryness of Vasa, which can increase Vata dosha. Goghrita provides lubrication and nourishment, making the formulation more balanced and less likely to aggravate Vata.
4. **Madhu (Honey)**: Madhu balances Kapha dosha and adds a sweet taste to the formulation, which helps in soothing the throat and respiratory tract. It also acts as a preservative and enhances the overall taste and acceptability of the preparation.
5. **Sita (Sugar)**: Sugar, combined with water, provides a desirable consistency and helps in shaping the formulation. It also adds a sweet taste, which complements the other ingredients and helps in making the preparation more palatable.

The combination of these ingredients results in a formulation that is effective in treating respiratory conditions while balancing the doshas, providing nourishment, and enhancing overall health.

Multiple Choice Questions

1. **What does "Adharabhuta Siddhanta" mean in the context of pharmaceutical science?**
   a. A system for categorizing medicinal plants
   b. The fundamental principle or doctrine underlying a system of thought
   c. The method of preserving medicinal substances
   d. A classification of Ayurvedic treatments
2. **According to "Sharngadhara Samhita," when is the ideal time to collect drugs for general herbal preparations?**
   a. Grishma Ritu (Summer)
   b. Hemant Ritu (Winter)
   c. Sharad Ritu (Autumn)
   d. Varsha Ritu (Monsoon)
3. **What is the correct time of the day for drug collection, according to "Sharngadhara Samhita"?**
   a. Noon, during the hottest part of the day
   b. Morning, on an auspicious day
   c. Evening, just before sunset
   d. Midnight, under a full moon
4. **According to "Sushruta Samhita," when should animal-derived substances (Pranija Dravya) be collected?**
   a. When the animal is in a fasting state
   b. After the animal has consumed fresh food
   c. After the animal has fully digested its food (Jinaahara Kala).
   d. Immediately after birth
5. **During which Ritu (season) should Mula (roots) of medicinal plants be collected according to "B.R. Paribhasa Prakarana"?**
   a. Varsha & Vasanta b. Grishma & Shishira
   c. Hemanta & Sharad d. Sharad & Vasanta
6. **Which type of soil is recommended for collecting medicinal plants used for "Virechana" (purgation)?**
   a. Agni and Akash predominant soil
   b. Prithvi and Jala predominant soil
   c. Akasha predominant soil
   d. Vayu predominant soil
7. **According to Ayurvedic guidelines, which of the following types of soil is considered inappropriate for collecting medicinal plants?**
   a. Rocky soil b. Soil near wells
   c. Soft soil d. Moist soil
8. **What is the "Rule of Duplication" (Dviguna Mana Ganana in Ayurvedic drug formulation?**
   a. Use twice the amount of dry ingredients compared to wet ingredients
   b. Use twice the amount of wet ingredients compared to dry ingredients
   c. Use equal amounts of dry and wet ingredients
   d. Do not use fresh ingredients
9. **Which of the following plants is an exception to the "Rule of Duplication" (Dviguna Mana Ganana) and should not be doubled in quantity when used fresh?**
   a. Guduchi b. Tulasi
   c. Haritaki d. Amala
10. **According to the text, which of the following practices is important for preserving the collected drugs?**
    a. Storing them in open containers in a ventilated area
    b. Storing them in secure containers in a storeroom with a single direction of ventilation
    c. Exposing them to direct sunlight
    d. Storing them near a water source
11. **What does the "Rule of Duplication" (Dviguna Mana Ganana) in Ayurveda suggest?**
    a. Use equal amounts of dry and wet ingredients
    b. Use double the amount of dry ingredients compared to wet ingredients
    c. Use double the amount of wet ingredients compared to dry ingredients
    d. Use half the amount of wet ingredients compared to dry ingredients
12. **Why is the "Rule of Duplication" important in Ayurvedic formulations?**
    a. It ensures that the medicine has an appropriate color
    b. It helps maintain the therapeutic efficacy and intended qualities of the formulation
    c. It ensures the medicine is only used during the rainy season
    d. It eliminates the need for preservatives
13. **Which of the following drugs is an exception to the "Rule of Duplication"?**
    a. Guduci b. Haritaki
    c. Musta d. Ashvagandha
14. **What does "Rasa" refer to in Ayurveda?**
    a. The post-digestive effect of a drug
    b. The potency of a drug
    c. The taste and potential action of a substance
    d. The unique property beyond analysis
15. **Which of the following is classified as "Sita Virya" (cool potency)?**
    a. Dipana (digestive stimulant)
    b. Svedana (sweat-inducing)
    c. Prahladana (refreshing)
    d. Vamana (emetic).
16. **Which of the following is a property of Madhura Rasa?**
    a. Ushna (hot), Laghu (light)
    b. Snigdha (unctuous), Guru (heavy)
    c. Ruksha (dry), Laghu (light)
    d. Ushna (hot), Guru (heavy)
17. **What does the term "Prabhava" denote in Ayurveda?**
    a. The potency of a drug
    b. The taste of a drug
    c. The unique, specific action of a drug
    d. The final metabolic product of a drug
18. **What is the post-digestive effect of a substance in Ayurveda referred to as?**
    a. Virya b. Vipaka
    c. Guna d. Rasa
19. **Which of the following statements about "Vipaka" is correct?**
    a. It is unrelated to a drug's pharmacological action
    b. It is the factor responsible for a drug's primary taste
    c. It affects the pharmacological action and therapeutic efficacy of a drug
    d. It only describes the medium used for storage
20. **Which among the following types of Rasa is considered "Snigdha" (unctuous) and "Ushna" (hot)?**
    a. Katu (pungent) b. Amla (sour)
    c. Tikta (bitter) d. Kashaya (astringent)
21. **What does "Anukta Visheshokta Grahana" primarily refer to in Ayurvedic practice?**
    a. Interpretation of directly stated references
    b. Interpretation of unstated or vaguely mentioned references
    c. Use of modern medical texts
    d. Practice of preparation methods
22. **What does the term "Anukta" specifically mean?**
    a. Vaguely mentioned
    b. Unstated
    c. Incorrectly mentioned
    d. Overstated
23. **Which of the following is considered an exception under "Anukta Visheshokta Grahana" for the term "Taila"?**
    a. Jala b. Mrita Patra
    c. Tila Taila d. Prabhata Kala
24. **Under "Anukta Visheshokta Grahana," what is considered when "Patra" is unspecified?**
    a. Jata b. Prabhata Kala
    c. Mrita Patra d. Tila Taila
25. **Which preparation is named based on its therapeutic effect?**
    a. Chyavanaprasha Avaleha
    b. Hingvashtaka Churna
    c. Arshoghana Vati
    d. Sudarshana Churna
26. **Which name is based on the number of ingredients used?**
    a. Dadimastaka Churna
    b. Ashta Katvara Taila
    c. Kshira Shat Pala Ghrita
    d. Draksharishta
27. **Which of the following is a name based on the season or collection timing?**
    a. Pushyanaga Churna
    b. Sudarshana Churna
    c. Rasa Manikya
    d. Pinda Taila
28. **What is the primary purpose of "Namakarana" in formulations?**
    a. To enhance taste
    b. To ensure clear identity and guide proper use
    c. To standardize preparation methods
    d. To increase shelf life
29. **Which of the following formulations is named after a deity's weapon?**
    a. Chandraprabha Gutika
    b. Sudarshana Churna
    c. Gangadhara Churna
    d. Arogyavardhini Vati
30. **What does "Grahana" refer to in the context of "Anukta Visheshokta Grahana"?**
    a. Preparation of herbs
    b. Preservation techniques

c. Understanding or interpretation
d. Pharmacological actions

31. What is "Aushadha Sevana Kala" in Ayurveda?
a. The method of preparing Ayurvedic medicines
b. The appropriate time for administering aushadha (medicine)
c. The list of herbs used in Ayurvedic formulations
d. The dietary restrictions to follow during medication

32. According to Acharya Charaka, how many periods are suitable for aushadha administration?
a. Five b. Ten
c. Eleven d. Twelve

33. What does the term "Bhuktadau" refer to in Aushadha Sevana Kala?
a. Taking medicine early morning on an empty stomach
b. Taking medicine along with food
c. Taking medicine after food
d. Taking medicine during sleep

34. Which text mentions "Nisi" as a period for drug administration?
a. Charaka Samhita b. Sushruta Samhita
c. Ashtanga Sangraha d. Sharngadhara Samhita

35. Which of the following is NOT a period mentioned by Sharngadhara for aushadha administration?
a. Suryodaya b. Divasabhojana
c. Madhyabhakta d. Nishi

36. What is the primary aim of Chronotherapeutics in modern medicine?
a. To develop new drugs
b. To time drug administration for optimized treatment outcomes
c. To replace traditional medicine with modern approaches
d. To determine the best combination of drugs for chronic diseases

37. Which of the following periods for drug administration is mentioned by both Sushruta and Vagbhata?
a. Suryodaya b. Pragbhakta
c. Sayanbhojana d. Bhuktadau

38. Which Aushadha Kala is described as "taking the medicine in between two meals"?
a. Bhuktadau b. Antarabhakta
c. Grasa d. Samudga

39. According to the concept of "Chronotherapeutics," which factor is NOT considered when determining optimal dosing schedules?
a. Patient's age b. Patient's lifestyle
c. Patient's education level d. Disease status

40. What is the term used for "taking medicine frequently or repeatedly" in Aushadha Sevana Kala?
a. Grasantara b. Muhurmuhuh
c. Abhakta d. Samudga

41. What does the term "Saviryata Avadhi" refer to in Ayurveda?
a. The method of preparation of a medicine
b. The potency and duration of a medicine's therapeutic properties
c. The cost of Ayurvedic formulations
d. The color and flavor of Ayurvedic medicines

42. Which factor does NOT influence the Saviryata Avadhi of an formulation?
a. Ingredients used b. Packaging material
c. Temperature of administration
d. Storage conditions

43. According to classical texts, what is the shelf life of "Churna Kalpana"?
a. 3 months b. 6 months
c. 1 year d. 2 months

44. Which of the following formulations is considered to have an infinite shelf life?
a. Kvatha b. Avaleha
c. Asava and Arishta d. Churna

45. According to the Gazetted guidelines of the Government of India (2016), what is the shelf life of "Ghrita"?
a. 1 year b. 2 years
c. 3 years d. 5 years

46. Which of the following has the shortest Saviryata Avadhi according to classical texts?
a. Svarasa b. Anjana
c. Gutika d. Ghrita

47. What is the Saviryata Avadhi for "Kvatha" according to "Yo.Ra.Jva.Chi.Aush.Vich. 4"?
a. 2 years b. 3 hours
c. 6 months d. 1 year

48. What is the importance of determining the Saviryata Avadhi of an Ayurvedic formulation?
a. Ensuring the medicine is cost-effective

b. Determining the color and taste of the formulation
c. Maintaining therapeutic efficacy and preventing adverse effects
d. Increasing the production rate

49. What is the shelf life of "Rasaushadi" as per the guidelines in the Government Gazette of India (2016)?
a. 5 years b. 10 years
c. 3 years d. 2 years

50. Which storage condition is NOT critical for maintaining the Saviryata Avadhi of an Ayurvedic formulation?
a. Air contact b. Light exposure
c. Duration of exposure to sound
d. Humidity

51. What does the term "Matra" refer to in Ayurveda?
a. The exact formulation of a medicine
b. The measure of various factors like quantity, size, duration, or degree
c. The specific herbs used in a preparation
d. The standardization process of herbal medicines

52. Which of the following is NOT a factor considered in determining "Aushadha Matra" in Ayurveda?
a. Agni (Digestive Power)
b. Vayas (Age)
c. Sattva (Mental Strength)
d. Desha (Habitat)

53. According to Sharngadhara, how is the dosage determined for a one-month-old child?
a. 5 ratti (625 mg) b. 1 ratti (125 mg)
c. 2 ratti (250 mg) d. 10 ratti (1250 mg)

54. Which rule is commonly used for calculating pediatric dosages based on age?
a. Dilling Rule b. Clark's Rule
c. Fried's Rule d. Young's Rule

55. Why might elderly individuals require lower dosages of medication?
a. Due to higher body mass
b. Due to increased organ function
c. Due to changes in metabolism and reduced organ function
d. Due to decreased sensitivity to medicate

56. What is the primary function of Anupana in Ayurveda?
a. To increase the taste of the medicine
b. To enhance the efficacy and absorption of the medicine
c. To act as the main ingredient in the medicine
d. To provide color and fragrance to the medicine

57. Which of the following substances can be used as an Anupana?
a. Alcohol b. Milk
c. Sandalwood d. Clay

58. According to Ayurvedic texts, which of these is NOT a definition of Anupana?
a. Anu pashchata piyate iti anupanam (consumed after food.
b. Anu sakam piyate iti anupanam (consumed along with food.
c. Anu nasikam dharyate iti anupanam (applied to the nose)
d. Anu sah pashchath piyate iti anupanam (taken after food.

59. What does Sharngadhara compare Anupana to, in order to illustrate its role in medicine?
a. Honey on bread b. Oil on water
c. Butter on hot toast d. Wax on wood

60. Why is it important to consume an Anupana like water during meals?
a. To cleanse the palate
b. To slow down digestion
c. To maintain the moisture and texture of food, aiding in digestion
d. To add flavor to the meal

61. What are polyherbal formulations in Ayurveda?
a. A formulation using a single herb
b. A formulation combining two or more herbs
c. A formulation with only mineral components
d. A formulation without any herbs

62. Why are polyherbal formulations often preferred over single herb usage in Ayurveda?
a. Single herbs are too expensive
b. Single herbs often lack the potency required for a therapeutic response
c. Polyherbal formulations are always safer
d. Polyherbal formulations are easier to prepare

63. Which principle in Ayurveda states that "opposites balance"?
a. Samanya b. Vishesha
c. Prakriti d. Sanskara

64. Which of the following is NOT a reason for combining herbs in a formulation?
a. Neutralizing toxicity
b. Flavor enhancement

c. Reducing the cost of herbs
d. Preventing side effects

65. According to the principle of "Samanya," what is the approach in selecting ingredients for a formulation?
a. Choosing herbs with opposite qualities
b. Using a combination of mineral and plant-based herbs
c. Selecting herbs with similar properties to enhance a specific function
d. Combining herbs from different geographical regions

66. What is the purpose of "Carrying Herbs" or "Assimilating Herbs" in Ayurveda?
a. To increase the weight of the formulation
b. To improve digestion and assimilation of the compound
c. To provide color and fragrance
d. To act as preservatives

67. Which of the following herbs is used in Ayurvedic formulations to balance Kapha and soothe the throat?
a. Ginger (Zingiber officinale)
b. Honey (Madhu)
c. Neem (Azadirachta indica.
d. Shatavari (Asparagus racemosus)

68. What is the significance of the "Principle of Synergy" in Ayurveda?
a. Mixing herbs with different properties to create a balanced formulation
b. Combining herbs with similar properties to increase therapeutic effects
c. Using only single herbs to avoid toxicity
d. Adding minerals to herbal formulations for added strength

69. What does Acharya Charaka's term "Mahakashaya" refer to in Ayurveda?
a. A single herb formulation
b. A combination of multiple herbs grouped by similar therapeutic actions
c. A form of mineral medicine
d. A specific dietary recommendation

70. Which principle is applied when adding a warming herb like Ginger to a formulation with cold and dry herbs?
a. Principle of Synergy
b. Principle of Opposition
c. Principle of Compatibility
d. Principle of Correspondence

Answer Sheet

1.	A.	2.	C.	3.	B.	4.	C.	5.	B.	6.	B.	7.	B.	8.	B.
9.	A.	10.	B.	11.	C.	12.	B.	13.	A.	14.	C.	15.	C.	16.	B.
17.	C.	18.	B.	19.	C.	20.	B.	21.	B.	22.	B.	23.	C.	24.	C.
25.	C.	26.	A.	27.	A.	28.	B.	29.	B.	30.	C.	31.	B.	32.	B.
33.	A.	34.	C.	35.	C.	36.	B.	37.	B.	38.	B.	39.	C.	40.	B.
41.	B.	42.	C.	43.	D.	44.	C.	45.	B.	46.	A.	47.	B.	48.	C.
49.	B.	50.	C.	51.	B.	52.	C.	53.	B.	54.	D.	55.	C.	56.	B.
57.	B.	58.	C.	59.	B.	60.	C.	61.	B.	62.	B.	63.	B.	64.	C.
65.	C.	66.	B.	67.	B.	68.	B.	69.	B.	70.	B.				

Short Question Answer

1. Describe Aushadha Sevana Kala
2. Write short note on Anukta Visheshokta Grahana
3. Saviryata Avadhi
4. Yougika Dravya Siddhanta
5. Write the importance of Anupana
6. Aushadha Namakarana and relevance with example.

Long Question Answer

1. Describe Adharabhuta Siddhanta in detail.
2. Explain Dravya Sangraha and Samrakshana Vidhi.

• • •

4 Yantroprakaranani - I

• Lecture: 6 hours, non-lecture: 4 • • Total Marks- 5 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Introduction

The term "Yantra" describes the tools and equipment utilised in various alchemical procedures in Rasa Shastra, a specialised branch of Ayurveda that deals with chemistry and alchemy. Yantras are essential for preparing and cleansing metals, minerals, and herbal remedies. They support several procedures that are necessary to create powerful pharmaceutical compositions, including heating, grinding, distillation, sublimation, and calcination. Rasa Shastra mentions several kinds of Yantras, each intended for a certain purpose. Khalva Yantra is utilised for grinding, Puta Yantra for burning, and Dola Yantra for purifying or the Shodhana method, for instance. Depending on its intended use, each Yantra is made from a particular substance, such as clay, metal, or stone. Since their proper use guarantees the safety and effectiveness of the alchemical medicines, yantras are an essential component of traditional Ayurvedic medicine.

Definition

स्वेदादिकर्मनिर्मातुं वार्तिकेन्द्रैः प्रयत्नतः।
यन्त्र्यते पारदो यस्मात्तस्माद्यन्त्रमिति स्मृतम्।। (R.R.S. 9/2)

Yantras are instruments used for complex operations to control Parada, including processes like Svedana (boiling), etc.

रसो नियन्त्र्यते येन यन्त्रं तदिति कथ्यते।। (A.K. 26/1)

The device/ Equipment/ Instrument by which mercury is controlled is called a Yantra.

रसोपरसलोहाद्या मारणाद्यर्थसिद्धये।
यन्त्र्यतेऽनेन यस्मात्तु तस्माद् यन्त्रं प्रकीर्तितम्।। (R.T. 4/1)

The various types of apparatus used for pharmaceutical procedures such as swedana (steaming), mardana (trituration), shodhana (purification), marana (incineration), and other processes on different rasa dravya (substances like rasa, uparasa, dhatu, etc.) are referred to as yantra (apparatus).

Number of Yantras

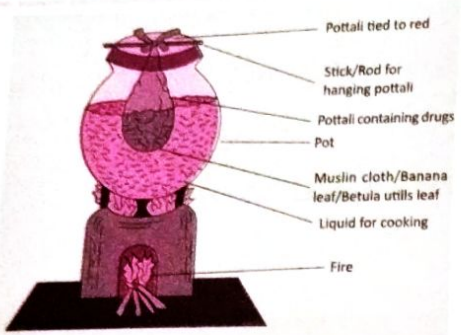
- Rasa Ratna Samuchchaya- 32
- Rasa Tirangini- 20
- Anandakanda – 41
- Parada Samhita- 45
- Rasendra Chudamani- 30
- Rasa Kamadhenu- 26
- Rasendra Bhaskara- 15
- Rasa Prakasha Sudhakara- 40
- Parada Samhita- 45
- Rasa Jala Nidhi- 37

1. Dola Yantra (दोला यंत्र)

द्रवद्रव्येण भाण्डस्य पूरितार्धोदकस्य च।
मुखस्योभयतो द्वारद्वयं कृत्वा प्रयत्नतः।।
तयोस्तु निक्षिपेद्दण्डं तन्मध्ये रसपोटलीम्।
बद्ध्वा तु स्वेदयेदेतद्दोलायन्त्रमिति स्मृतम्।। (R.R.S. 9/3-4)

(See fig. next page)

Definition: Dolayantra is a conventional apparatus used for svedana (steaming) of medicinal drugs like parada, svarna makshika, shilajatu, guggulu, etc., as part of their purification process.



Materials Needed

- A clean and strong mud pot or a wide-mouthed metallic container of desired size.
- A thin rod.
- Clean, white triple-folded cloth.
- Strong and long thread.
- Liquid for svedana (e.g., godugdha, kanji, triphala kvatha).

Construction Steps

- Select a suitable pot or container.
- Make two holes at the neck of the pot, from one side to the other.
- Insert the thin rod through these holes.
- Fill the pot with the specified liquid up to the required level.

Preparation of the Drug

- Tie the medicinal drug in a clean, white triple-folded cloth to form a pottali (bundle).
- Use a strong and long thread to secure the pottali.
- Hang the pottali into the liquid by tying its thread at the midpoint of the rod, ensuring it neither touches the bottom of the pot nor remains above the liquid level.

Heating Process

- Carefully place the pot over a mild fire and begin heating.
- As the liquid starts boiling, the drug material undergoes svedana.
- Adjust the length of the pottali thread gradually as the liquid level decreases to keep the pottali immersed.

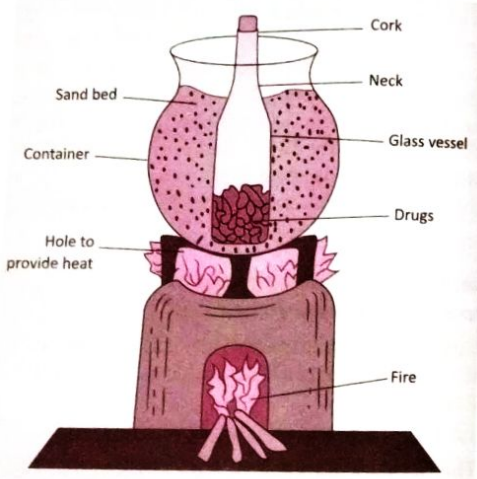
Special Instructions

- Continue the swedana process for the specified time.
- For swedana of parada, tie the pottali with a layer of 'Bhojapatra' (Betula utilis) and thick cloth.
- For better swedana, some practitioners close the mouth of the pot during the process.

Usage: This type of apparatus, dolayantra, is particularly used for the swedana of various medicinal drugs.

2. Baluka Yantra (बालुका यंत्र)

सरसां गूढवक्त्रां मृद्वस्त्राङ्गुलघनावृताम्।
शोषितां काचकलशीं त्रिषु भागेषु पूरयेत्।।
भाण्डे वितस्तिगम्भीरे बालुकासु प्रतिष्ठिताम्।
तद्भाण्डं पूरयेत्त्रिभिरन्याभिरवगुण्ठयेत्।।
भण्डवक्त्रं मणिकया सन्धिं लिम्पेन्मृदा पचेत्।
चुल्ल्यां तृणस्य चादाहान्मणिकापृष्ठवर्त्तिनः।
एतद्धि बालुकायन्त्रं तद्यन्त्रं लवणाश्रयम्।।
पञ्चाढबालुकापूर्णभाण्डे निक्षिपय यत्नतः।
पच्यते रसगोलाद्यं वालुकायन्त्रमीरितम्।। (R.R.S. 9/36-39)



Components

- Glass bottle with a narrow mouth.

- Earthen vessel.
- Sand (for Valuka Yantra) or salt (for Lavana Yantra).
- Rag and mud for sealing.
- Saucer.
- Grass stick (for monitoring heat).

Preparation

1. **Glass Bottle**: Wrap the glass bottle containing the mercurial product with rag and mud. Dry the bottle thoroughly.
2. **Filling with Sand**: Fill an earthen vessel with 8"-9" of sand at the bottom.
3. **Placing the Bottle**: Place the prepared glass bottle in the vessel and fill it with sand up to the neck of the bottle, ensuring it is surrounded on all sides.

Sealing and Heating

1. **Sealing**: Place a saucer on top of the vessel and seal it with rag and mud. Allow it to dry completely.
2. **Heating**: Put the apparatus on fire for slow heating. Monitor the heat using a grass stick placed on the saucer; it should not burn, indicating controlled heat levels.

Quantity of Sand

Use approximately 5 adhaka (around 12.8 kg) of sand to fill the earthen vessel containing the glass bottle with the mercurial product.

Usage

Baluka Yantra is used in preparing kupipakva rasayanas such as Rasasindura, Suvarnaraja Vangeshwara, and Makaradhvaja by subjecting the mercurial product to slow heating.

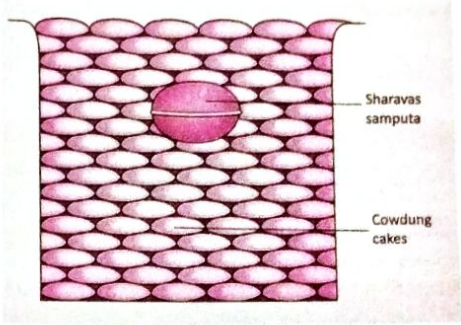
3. Puta Yantra (पुटयंत्र)

शरावसम्पुटान्तःस्थं करीषेष्वग्निमानवित्।
पचेच्चुल्ल्यां द्वियामं वा रसं तत्पुटयन्त्रकम्।। (R.R.S. 9/45)

(See fig. top)

Components

- Two Sharavas (earthen pots).
- Parada (mercury).
- Cowdung cakes or a stove.



Preparation

Place Parada in one Sharava, then cover it with the second Sharava to form a Samputa (sealed container).

Heating Process

- **Cowdung Cakes**: Surround the Samputa with cowdung cakes, the number of which is determined by scholars.
- **Stove**: Alternatively, place the Samputa on a stove.

Heating Duration

- **Time**: Heat the Samputa for 2 Prahara, equivalent to 6 hours.

Usage

This apparatus, called Puta Yantra, is used for the heating and processing of Parada (mercury) in various alchemical procedures.

4. Khalva Yantra (खल्व यंत्र)

खल्लयोग्या शिला नीला श्यामा स्निग्धा दृढा गुरुः।
षोडशाङ्गुलकोत्सेधा नवाङ्गुलकविस्तरा।।
चतुर्विंशाङ्गुला दीर्घा घर्षणी द्वादशाङ्गुला।
विंशत्यंगुलदीर्घा वा स्यादुत्सेधे दशांगुला।।
खल्लप्रमाणं तज्ज्ञेयं श्रेष्ठं स्याद्रसकर्मणि।। (R.R.S. 9/78-80)

Khalva Construction and Specifications

Material

- Stone for making the Khalva should be:
- Blue or light black in color.
- Smooth to touch.
- Strong and heavy.

Dimensions

- Length: 24 angula.
- Width: 9 angula.
- Height: 16 angula.

Usage

Both types of Khalva are considered optimal for various processes involving Parada (mercury).

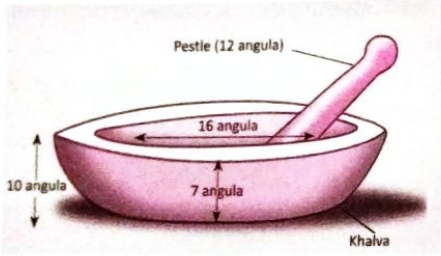
Types

खल्लयंत्र त्रिधा प्रोक्तं रसादिसुखमर्दने।।
निरुद्गारौ सुमसृणौ कार्यौ पुत्रिकया युतौ।। (R.R.S. 9/81–82)

1. Ardhachandra Khalva
2. Vartula Khalva
3. Tapta Khalva

1. Ardhachandra Khalva / अर्धचंद्र खल्व (Semicircular Khalva)

उत्सेधे स दशाङ्गुलः खलुं कलातुल्याङ्गुलायामवान् विस्तारेण दशाङ्गुलो मुनिमितैर्निम्नैस्तथैवाङ्गुलैः। पात्यां द्व्यङ्गुल-विस्तरश्च मसृणोऽतीवार्द्धचन्द्रोपमो घर्षो द्वादशकाङ्गुलश्च तदयं खल्लो मतः सिद्धये।। (R.R.S. 9/83)



Construction and Specifications

- **Material:**
  - Made from an even stone slab.
- **Dimensions**

Khalva:

- **Length**: 16 angula.
- **Width**: 16 angula.
- **Outer Height**: 10 angula.
- **Inner Depth**: 7 angula.

Pestle:

- **Length**: 12 angula.
- **Shape:**

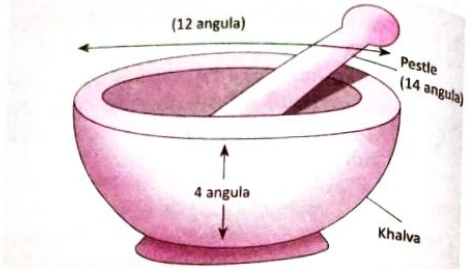
Semicircular in design.

- **Usage**

This type of Khalva is considered very useful for various processes in Parada (mercury) and other alchemical preparations.

2. Vartula Khalva/ वर्तुल खल्व (Circular Khalva)

द्वादशाङ्गुलविस्तारः खल्लोऽतिमसृणोपलः।
चतुरङ्गुलनिम्नश्च मध्येऽतिमसृणीकृतः।।
मर्दकश्चिपिटोऽधस्तात्सुग्राह्यश्च शिखोपरि।
अयं तु वर्तुलः खल्लो मर्दनेऽतिसुखप्रदः।। (R.R.S. 9/85–86)



Construction and Specifications

Material:

- Made from a very smooth stone slab.
- The bottom should be very smooth.

Dimensions:

- **Width**: 12 angula.
- **Depth**: 4 angula.

Shape:

- Circular (Vartula) design.

Pestle:

- Should have a flat bottom.
- Should provide a proper grip for ease of use.

Usage:

- This type of Khalva is ideal for grinding, as it allows for smooth and efficient operation.

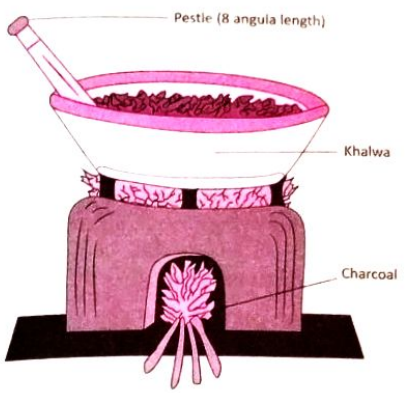
3. Tapta Khalva/ तप्त खल्व

लौहो नवाङ्गुलः खल्लो निम्नत्वे च षडङ्गुलः।
मर्दकोऽष्टाङ्गुलश्चैव तप्तखल्लाभिधोऽप्ययम्।। (R.R.S. 9/87)

Construction and Specifications

Material:

- Made from iron (or metal), suitable for use over fire.



Dimensions:

Khalva (Mortar):

- **Width**: 9 angula.
- **Depth**: 6 angula.

Pestle:

- **Length**: 8 angula.

Purpose

- Used for preparing medicine when the mortar needs to be kept over fire.
- Iron is chosen as it can withstand heat without cracking, unlike stone mortars.

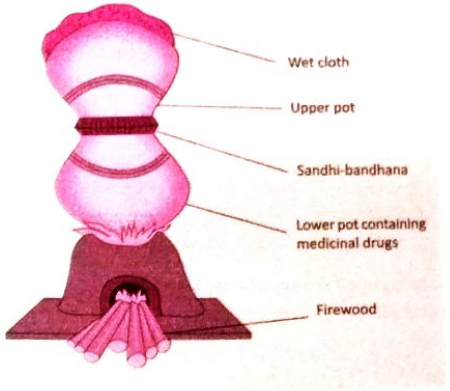
Usage

- This setup, called Tapta Khalva Yantra, is specifically used in processes requiring heating.

5. Patana Yantra (पातन यंत्र)

1. Urdhva Patana Yantra (ऊर्ध्व पातन यंत्र)

अष्टाङ्गुलपरीणाहमानाहेन दशाङ्गुलम्।
चतुरङ्गुलकोत्सेधं तोयाधारं गलादधः।।
अधोभाण्डे मुखं तस्य भाण्डस्योपरिवर्त्तिनः।
षोडशाङ्गुलविस्तीर्णपृष्ठम्याम्ये प्रवेशयेत्।।
पार्श्वयोर्महिषीक्षीरचूर्णमण्डूरफाणितैः।
लिप्त्वा विशोषयेत्सन्धिं जलाधारे जलं क्षिपेत्।
चुल्ल्यामारोपयेद्यत्नात्पातनायन्त्रमुच्यते।। (R.R.S. 9/6–8)



Construction and Usage

Components

- **Two containers:**
  - **First Container**: Bottom measuring 16 anguli (approximately 12 inches) in width or diameter.
  - **Second Container**: Smaller mouth than the first container, so it can be inserted into the mouth of the larger container.
- Mineral substances.
- Paste made from grinding lime powder, Mandura (oxide of iron), and Phanita in buffalo's milk.
- Wet cloth.

Construction Steps

1. **Filling**: Fill the second (smaller) container with mineral substances.
2. **Inversion**: Invert the first (larger) container and place it over the smaller container so that the mouth of the smaller container fits into the mouth of the larger container.
3. **Sealing**: Seal the joining parts with the paste made from lime powder, Mandura, and Phanita in buffalo's milk.
4. **Drying**: Allow the sealed apparatus to dry completely.

Heating Process

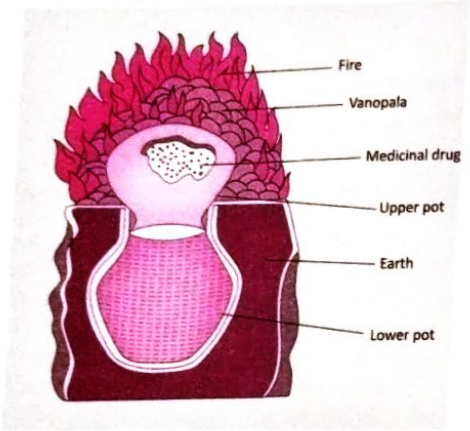
1. **Placement**: Place the dried apparatus on a stove for heating.

2. **Wet Cloth**: Place a wet cloth on the outer surface of the upper (larger) container. Ensure the cloth remains wet throughout the heating process.
3. **Yantra Name**: This setup is called Urdhva Patana Yantra.

Usage: Patana Yantra is used for processes involving the heating of mineral substances, with the unique setup allowing for efficient sublimation or distillation.

2. Adhahpatana Yantra (अध:पातन यंत्र)

अधोर्ध्वभाजने लिप्तस्थापितस्य जले सुधीः।
दीप्तैर्वनोपलैः कुर्यादध:पातं प्रयत्नतः।। (R.R.S. 9/9)

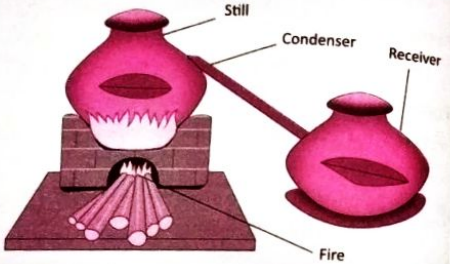


Construction and Usage

- **Components**
  - Two earthen containers.
  - Hingula (cinnabar).
  - Water.
  - Sealing paste.
  - Cowdung cakes.
- **Preparation**
  - **Smearing**: Smear the inner surface of the upper container with hingula.
  - **Positioning**: Place the upper container upside down so that its mouth fits into the mouth of the lower container, which contains water.
  - **Sealing**: Properly seal the joint between the two containers.
- **Setup**
  - **Burying**: Bury the lower container inside the earth for stability.
  - **Covering**: Spread cowdung cakes upon the upper container.
- **Yantra Name**: This setup is called Adhah-patana Yantra.
- **Usage**: Adhahpatana Yantra is used in alchemical processes involving hingula, utilizing the unique setup for efficient heating and sublimation while maintaining control over the substances.

3. Tiryak Patana Yantra (तिर्यक्पातन यंत्र)

क्षिपेद्रसं घटे दीर्घेनताधोनालसंयुते।
तन्नालं निक्षिपेदन्यघटकुक्ष्यन्तरे खलु।।
तत्र रुद्ध्वा मृदा सम्यग्वदने घटयोरथ।
अधस्तादग्निकुम्भस्य ज्वालयेत्तीव्रपावकम्।।
इतरस्मिन्घटे तोयं प्रक्षिपेत्स्वादु शीतलम्।
तिर्यक्पातनमेतद्धि वार्तिकैरभिधीयते।। (R.R.S. 9/10.12)



Construction and Usage

- **Components**
  - **Two vessels:** one with greater height and another to be placed on a lower plane.
  - A tube for connection.
  - Necessary substances.
  - Water.
  - Sealing paste.
- **Preparation**
  - **Connecting**: Attach a tube to the neck of the taller vessel. Ensure the other end of the tube projects into the body of the second, lower vessel.

- **Filling**: Place the necessary substances in the first (taller) vessel and fill the second (lower) vessel with water.
- **Sealing**: Close and seal the mouths of both vessels and the connecting portions of the tube.

- **Setup**

  Placement: Place the first vessel on fire for heating, ensuring the second vessel is positioned lower.

- **Usage**

  Tiryak Patana Yantra is used in Rasasastra for processes that require the horizontal distillation or sublimation of substances, ensuring efficient transfer and condensation through the connecting tube.

6. Darvika Yantra (दर्विकायंत्र)

चषकं दर्विकाकल्पं दीर्घहस्तकसंयुतम्।
दर्विकायन्त्रमेतद्धि गन्धशोधनसाधकम्।। (R.T. 4/39)

Construction and Usage

Components

- Iron or steel spoon.

Specifications

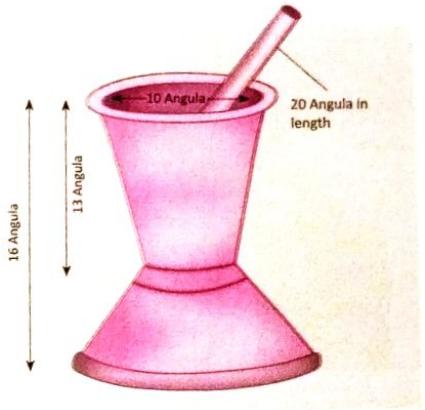
- **Head**: Should have a strong, deeper bowl-like structure.
- **Handle**: Should be strong and long, measuring 1 to 1.5 hasta (approximately 18 to 27 inches).

Usage

- Used for melting substances like 'gandhaka' (sulfur), 'naga' (lead), and 'vanga' (tin) during their purification procedures.

7. Ulukhala Yantra (उलूखलयंत्र)

दशाङ्गुलन्तु विस्तारे तूत्सेधे षोडशाङ्गुलम्।
त्रयोदशाङ्गुलं चैव निम्नत्वेन च संदृढम्।।
अयसा निर्मितञ्चैव मध्येऽतिमसृणीकृतम्।
विंशत्यङ्गुलदीर्घश्च लोहदण्डः सुशोभनः।।
उलूखलाभिधं यन्त्रं बुधैरेतत्प्रकीर्तितम्।
ताप्यादीनां कुट्टनार्थं यन्त्रमेतत्प्रयुज्यते।।
लघूनि चाथ दीर्घाणि युक्त्या यन्त्राणि कारयेत्।
दव्यमानानुकूल्येन विधानज्ञो भिषग्वरः।। (R.T. 4/58-61)



- **Common Use**: Used for pounding different medicinal substances.

Material: Made with iron.

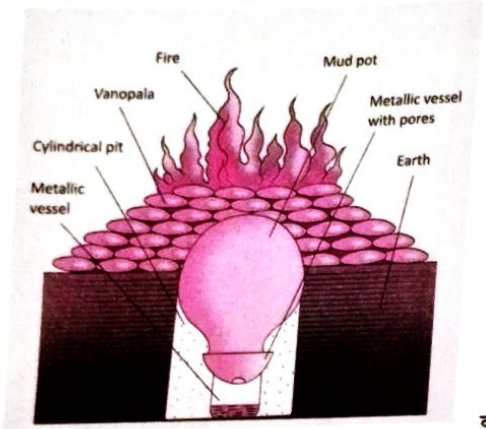
Measurements

- **Height**: 16 anguli
- **Diameter**: 10 anguli
- **Depth**: 13 anguli
- **Pestle**: Should have a length of 20 anguli.
- **Modification**: The wooden-made Udukhala Yantra is a modified form of the Ulukhala Yantra.
- **Modern Version**: Present-day mechanized form known as a pounding machine is used in Ayurvedic pharmacies.

8. Patala Yantra (पाताल यन्त्र)

भूमौ हस्तमितं निम्नं विदध्याद् गर्तमुत्तमम्।
तस्मिन् पातं निधायाथ तदूर्ध्वं पात्रमन्यकम्।।
आददीत ततस्तस्मिन्त्रौषधानि निधापयेत्।
आस्यमस्य शरावेण छिद्रगर्भेण रोधयेत्।।
पात्रमेतत्तु गर्तस्थे पात्रे यत्नेन विन्यसेत्।
विदध्यादनयोर्यत्नात् सुदृढं सन्धिबन्धनम्।।
मृदा सम्पूर्य गर्तन्तु वह्निं दद्यात् प्रयोगवित्।
स्वाङ्गशीतं ततो ज्ञात्वा रसतन्त्रविचक्षणः।।

उपरिस्थन्तु वै पात्रं शनैः समवतारयेत्।
अधःपात्रगतं तैलं गृह्णीयात्तु विधानतः।।
एतद् बुधैः समाख्यातं यन्त्रं पातालसंज्ञकम्।
आहर्तुं गन्धकादीनां तैलमेतत्प्रयुज्यते।। (R.T. 4/47-52)



Construction and Use of Patala Yantra

Pit Construction:

- A cylindrical pit with a height of one hasta (18 inches) is dug.
- The walls of the pit are covered with brick and cement to prevent mud from slipping in.

Arrangement of Components:

- At the base of the pit, an open vessel is placed.
- A metallic vessel of suitable size is selected, cleaned, and its base is made porous with small-sized holes.

Placement in the Pit:

- The porous metallic vessel is filled with the medicinal drug.
- It is placed upright at the mouth of another metallic vessel positioned at the base of the pit.

Sealing and Heating Process:

- An inverted wide-mouthed mud pot is placed above the metallic vessel and sealed to the edges of the pit.
- Dry cow dung cakes are heaped around the vessel on the ground and ignited.

Oil Extraction Process:

- As the heating process continues, oil from the medicinal drug inside the porous vessel trickles down through the holes.
- The oil collects in the open vessel placed inside the pit.

Collection of Oil:

- Once the process is complete and the apparatus cools down naturally, the upper vessels and pots are carefully removed.
- The inner open vessel is taken out to collect the extracted oil.

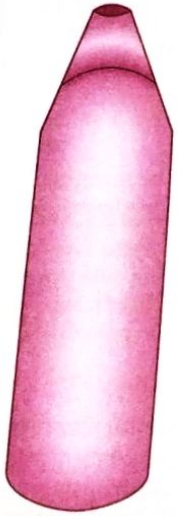
Use of Patala Yantra

Purpose: Used for extracting oil from herbal drugs.

Examples: Extraction processes such as Bhallataka taila patana and karanja taila patana are performed using this yantra.

9. Kupi Yantra (कूपी यन्त्र)

काचताम्रयुता कूपी दृढा रम्याकृतिस्तथा।
प्रलिप्य तूलमृत्स्नाभ्यां लेप्या शोष्या पुनः पुनः।।
इत्थं तु संस्कृता कूपी तत्र सूतं प्रवेशयेत्।
तन्मुखं मुद्रितं कृत्वा यन्त्र सिकताभिधे पचेत्।।
अथवा पाटवे यन्त्र यन्त्रे वाप्युभयात्मके।
कूपीयन्त्रं समुद्दिष्टं तदशोकःगुणावहम्।। (Parad Samhita)



Definition: A traditional Ayurvedic instrument used in Rasa Shastra (alchemy) for preparing the kupipakva rasayana.

Purpose

- Utilized for processes like distillation and sublimation to refine or combine substances into potent medicinal formulations.
- To make the bottle thermostable.

Design and Structure

पञ्चाढ वालुकापूर्णं भाण्डेनिक्षिप्य यत्नतः।
पच्यते रसगोलाद्यं वालुका यन्त्रमीरितम्।। (R.R.S. 9/39)
काचकूपी लोहकूपी चतुःपञ्च नवाङ्गुला।
सप्तधा लेपिता शुष्कासैव कर्पटमृत्स्नया:।।
(Rasashastra, P. Suresh, p. 113)

- Kupi could be made of glass or metal and should measure either 4, 5, or 9 inches and coated with a cloth and clay for seven times.
- Typically made from glass to withstand high temperatures and prevent chemical reactions with the substances inside.
- The yantra is sealed tightly to control the internal environment during the heating process.

श्वेताश्मानस्तुषाच्छाया शिखित्रा: शणकर्पटा:।
लोह किटं कृष्णमृच्च संयोज्या कूपिकामृदि।।
(R.P., Rasashastra, P. Suresh, p. 113)

Ingredients

- Khatika (Shveta Pashana)
- Tusha (husk)
- Chaya (Black clay)
- Vastra Khand (piece of cloth)
- Sikhitra (coal)

Preparation

- All the ingredients in equal proportions remove.
- The mixture of these 3 should be a swinger and competent together.

Application

- Pour the mixture on the bottle and expend all seven days doing this.

Alternative

- In the absence of black clay, use Chaya as a substitute.

Note :

छाया-कृष्णमृत्तिका अथवा कौलाली, कीलालयः कृतो लेपः खटिकालवणादिकः।
(Rasen.Chi., Rasashastra, P. Suresh, p. 113)

- While in Rasendra Chintamani the mud has been suggested as it is free from gravel, etc., and Lavana (Salt) was also added, which was not mentioned here.

तुषं भागद्वायं ग्राह्यं भागैकं वस्त्रखण्डकम्।
मृदं च त्रिगुणीकृत्य जलं दत्वा विमर्दयेत्।
नरकेशं समं कृत्वा किञ्चित्तावत्प्रकुट्टयेत्।
यावत्सिक्थसमाभासंमृत्पिण्डं जायते तथा।
यदा न शुष्कतामेति तथा यत्नं समाचरेत्।
एवं सप्तदिनादूर्ध्वं मृदं योगे प्रयोजयेत्।।
कूपिकादि वि लेपार्थं यत्नादेश्च भिषक्क्रमात्।
जलं बब्बुल निर्यासं समितां तत्समं कुरु।।
तयोस्तुल्यं लोहकिट्टंशुद्धमञ्जनसन्निभम्।
मुद्रां वारि यन्त्रस्य सिद्ध्यर्थं दुर्लभां कुरु।।
जलाग्नियोगतोनैव भिद्यतेत्र कदाचन।
(Shaivalabhakshan, Rasashastra, P. Suresh, p. 113)

In Shaivalabhashya, 2 parts of Tusha, 1 part cloth piece, and 3 parts clay have to be pounded with human hair by adding water until it becomes a wax-like paste. This should be applied to the flask or can be used to seal the apparatuses after drying.

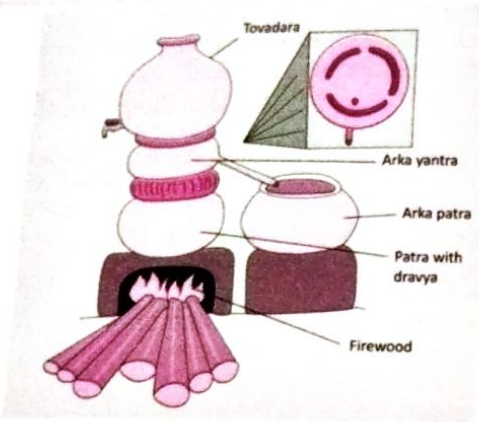
Usage

- Commonly used in the preparation of medicines that require precise chemical transformations like Rasa Sindura, Makardhvaja.
- Involves heating the contents under controlled conditions to achieve the desired alchemical process.

10. Arkapatana Yantra (अर्कपातन यंत्र)

Working Principle

1. **Heating**: The herbal mixture is heated in the distillation pot (Kacha) until it reaches its boiling point, causing volatile compounds like essential oils to evaporate.
2. **Vaporization**: Volatile compounds rise as vapor, carrying essential oils and other substances.
3. **Vapor Movement**: The vapor travels through a connecting tube to the condenser (Saras or Sarasa).



4. **Condensation**: In the condenser, the vapor is cooled and condenses into a liquid, forming a mixture of essential oils and water (hydrosol).
5. **Collection**: The liquid is collected in the receiver (Jalapatra). Essential oils, which are less dense, float on top and can be separated.

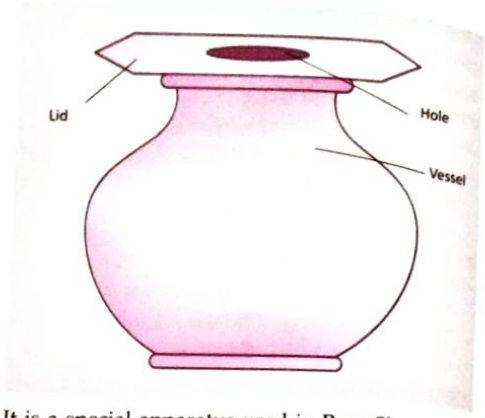
Procedure

1. Dry and grind herbs into a fine powder.
2. Assemble the distillation vessel, condenser, and collection vessel.
3. Place powdered herbs into the distillation vessel.
4. Pour water into the distillation vessel.
5. Apply heat to evaporate water and extract essential oils.
6. Cool vapor in the condenser to collect the liquid.
7. Gather the condensed herbal distillate in the collection vessel.
8. Cool the Arka and store in airtight containers away from light and heat.
9. Assess color, fragrance, and consistency of the Arka.

Advantages

1. **Concentration**: Produces a potent herbal distillate with enhanced therapeutic effects.
2. **Purity**: Extracts essential oils while leaving behind impurities.
3. **Enhanced Absorption**: Improves the body's ability to absorb beneficial compounds.
4. **Preservation**: Extends shelf life of the herbal properties.
5. **Targeted Treatment**: Allows precise extraction of specific therapeutic compounds.
6. **Reduced Dosage**: Smaller amounts are needed for effectiveness.
7. **Versatility**: Usable in various Ayurvedic formulations and treatments.

11. Pithara Yantra (पिठर यंत्र)



It is a special apparatus used in Rasa Shastra, an Ayurvedic alchemical science to process and prepare Bhasmas (calcined metal & mineral powders) and other alchemical substances. It is important for the Shodhana (Purification) of metals, Jarana of Puti Loha and minerals as well as Marana (Incineration).

Pithara Yantra Key Benefits and Usage

1. **Material**:
   - Made from heat-resistant materials like clay, stone, or metal.
2. **Design**:
   - Built as a direct pit or some specially constructed chamber.
   - Laminated layer of materials with even insulating layers to provide bottom-up, side-to-side consistent heat distribution.
3. **Function**:
   - Supplies consistent and proven heat needed to manufacture metals & minerals.

- Gets Heat 3D evenly to convert substances in a licensed professional manner without losing any parts from the potency.

4. **Processes**:
   - Used often in the Marana process to burn off metal such as gold, silver, and copper.
   - Converts metals into Bhasma (fine ash) which is used in Ayurvedic.

The Pithara Yantra serves a function core to the traditional Ayurvedic alchemical process and represents some of those more evolved methods for creating powerful medicines out of base materials.

12. Sharava Yantra (शराव यंत्र)

Sharava Yantra is widely used in the preparation of Ayurvedic medicines, particularly in processes such as sublimation, incineration, and calcination.

Structure:

- Consists of two earthen saucers (Sharavas).
- The medicinal substances are sealed inside these saucers.
- The edges of the saucers are sealed with clay to create an airtight environment.

Initial Setup:

- The setup is subjected to heat, either through a sand bath (Baluka Yantra) or direct heating.

Functionality:

- Ensures uniform heating of the substances.
- Prevents the escape of volatile elements during processing.

Indications:

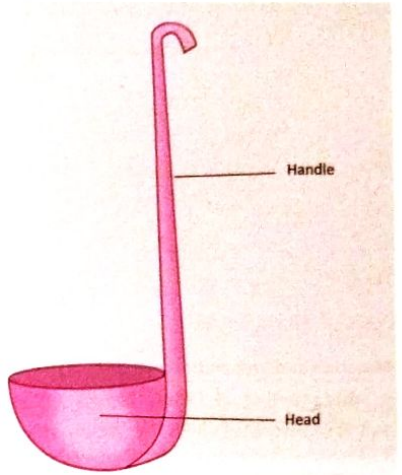
- Used in the preparation of Bhasmas (calcined powders or tablets).
- Also used in other Ayurvedic preparations requiring accurate heating techniques.

Significance:

- This tool is crucial for the standardization of Ayurvedic medicines, ensuring their safety, efficacy, and quality.

13. Palika Yantra (पालिका यन्त्र)

चषकं वर्तुलं लौहं विनताग्रोर्ध्वदण्डकम्।
एतद्धि पालिकायन्त्रं बलिजारणहेतवे।। (R.R.S. 9/50)



Construction and Use

Description:

- A chashaka (cup or small concave vessel) made of iron is fixed to a rod.
- The rod extends from the vessel and is bent outward at the other end.

Purpose:

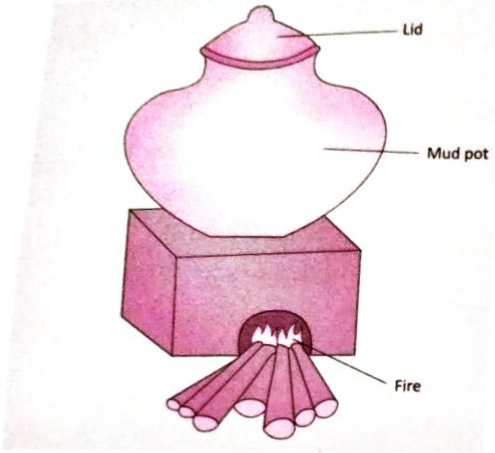
- Specifically designed for the process known as Jarana of Gandhaka.

Role of Palika Yantra

- The Palika Yantra facilitates this process by providing a structured apparatus to contain and manipulate the Gandhaka during heating or treatment.

14. Sthali Yantra (स्थाली यन्त्र)

स्थाल्यां ताम्रादि निक्षिप्य मल्लेनाऽऽस्यं निरुद्धय च।
पच्यते स्थालिकाधस्तात्स्थालीयन्त्रमिदं स्मृतम्।। (R.R.S. 9/67)



Construction and Use

Materials and Preparation:

- Minerals such as Tamra (copper) are combined with various medicinal drugs.
- These substances are placed together in an earthen vessel.

Covering and Sealing:

- A sharava (probably a lid or covering) is placed over the earthen vessel.
- The joint between the vessel and the sharava is sealed securely.

Heating Process:

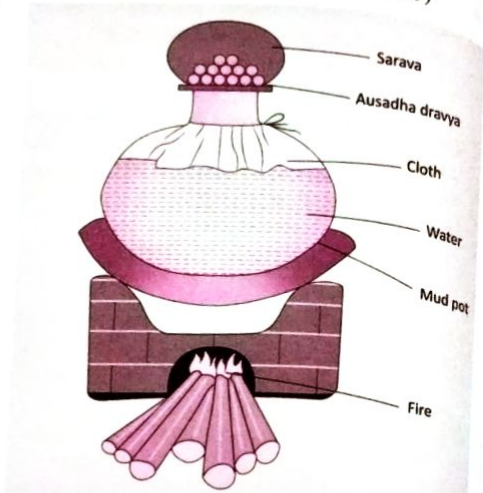
- The vessel, with its contents and sealed cover, is heated on a stove or suitable heating apparatus.

Purpose and Application:

- **Purpose**: The Sthali Yantra is used for a specific process involving the combined heating of minerals and medicinal substances.
- **Method**: By sealing and heating the vessel, practitioners facilitate interactions and transformations essential for traditional practices, likely in the context of Ayurveda or Rasatantra.

15. Svedana Yantra

साम्बुस्थाली मुखाबद्धे वस्त्रे पाक्यं निवेशयेत्।
पिधाय पच्यते यत्र स्वेदनीयन्त्रमुच्यते।। (R.R.S. 9/5)



Construction and Use

Components:

- A vessel containing water (specific liquid) is selected.
- The vessel is covered securely on the mouth with a strong cloth.

Setup:

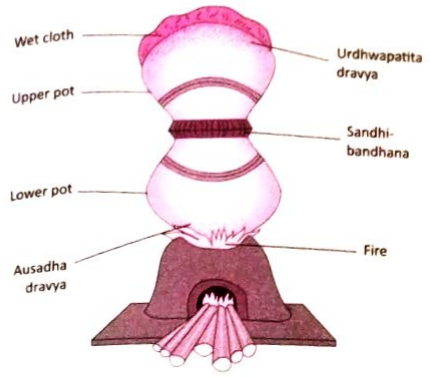
- The mineral substance to be processed is placed on top of the secured cloth covering the vessel.

Heating Process:

- The entire setup is heated.
- The vessel is specifically used for extracting medicinal substances.

16. Vidyadhara Yantra (विद्याधर यन्त्र)

यन्त्रं विद्याधरं ज्ञेयं स्थालीद्वितयसम्पुटात्।
चुल्लीं चतुर्मुखीं कृत्वा यन्त्रभाण्डं निवेशयेत्।।
तत्रौषधं विनिक्षिप्य निरुन्ध्याद्भाण्डकाननम्।
यन्त्रं विद्याधरं नाम तन्त्रज्ञैः परिकीर्त्तितम्।। (R.R.S. 9/27-28)



Construction and Use

Definition and Preparation:

- A samputa, formed by joining two vessels together, is known as the Vidyadhara Yantra.
- Scholars of Rasatantra named this apparatus for its specific purpose.

Construction of Stove:

- A suitable stove is constructed, tailored to fit the size and shape of the vessels used in the yantra.

Arrangement and Setup:

- One vessel is placed directly on the stove.
- Another vessel is carefully positioned on top of the first vessel, ensuring a sealed joint between them.

Application:

- This yantra is utilized in the practice of Rasatantra, a traditional science, for specific processes and procedures.

Purpose and Usage:

- **Purpose**: Designed to facilitate controlled heating and processing of substances as prescribed in Rasatantra.
- **Function**: Enables practitioners to carry out precise techniques involving the interaction of materials within the vessels.

Modern Machinery

Grinder Machine

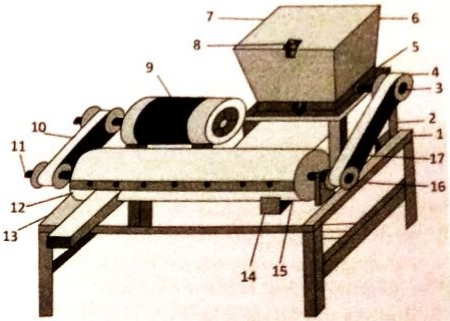


PLATE REFERENCES

1. Main Frameword
2. Grating Unit Frame
3. Pulley
4. Bearing Housing
5. Grating Shaft
6. Feed Hopper
7. Hopper Cover Lid
8. Lock Lid
9. Electric Motor
10. Belt
11. Rotor Shaft
12. Stator Casing
13. Discharge Chute
14. Stator Support
15. Stator Bearing
16. Shaft Key
17. Bolt

Definition

A grinder machine is a device used to carry out grinding operations, which include precise shape, size, and finish removal from metal and other materials using an abrasive wheel or belt.

Principle

The concept of abrasive action drives the operation of the grinder machine. By cutting, rubbing, and friction, material is removed from the workpiece's surface using a spinning abrasive wheel or belt. The wheel's or belt's abrasive particles gradually improve the material's surface and shape by scraping away tiny chips of it.

Usefulness

Grinding machines are essential in many industries for the shape and finishing of metal parts, honing cutting instruments, polishing and surface finishing, removing burrs and unnecessary material from workpieces, and producing precise measurements and smooth surfaces.

Types of Grinding Tools

1. Surface Grinders
2. Cylindrical Grinders

3. Centerless Grinders
4. Belt Grinders
5. Bench Grinder

Working Process

Operational Process:

1. First, prepare by selecting the appropriate belt or grinding wheel for the material and desired finish:
   - Attach the grinding wheel firmly to the spindle.
2. **Assembling the workpiece**: Fasten the workpiece to the holding apparatus or machine table:
   - Position the workpiece so that it contacts the grinding wheel in the correct way.
3. **Dressing the Grinding Wheel**: To keep a sharp cutting surface and get rid of flaws, use a dressing tool.
4. **Grinding Operation**: Press the start button to allow the wheel to spin at its maximum speed:
   - Make the first contact between the grinding wheel and the workpiece with little pressure.
   - Gradually raise the depth of cut or pressure to remove material.
   - To lessen heat buildup and remove debris, use coolant as needed.
5. Keep an eye on the grinding process and make adjustments as needed to ensure consistent material removal and surface polish:
   - Make any required adjustments after taking routine measurements of the workpiece to guarantee that its dimensions and tolerances are correct.
6. **Finishing**: Use the least amount of pressure necessary to get the appropriate proportions and surface finish.
   Examine the workpiece to make sure it meets all requirements for quality and specs.
7. **Shutdown and Cleanup**: Completely stop the wheel and turn off the machine:
   - Eliminate any debris and abrasive particles
   - Dress the grinding wheel as necessary so that it is ready for the subsequent procedure.

Benefits

1. Displays remarkable accuracy and smoothness of surface.
2. Versatile: Fits a range of shapes and materials.
3. Efficient: Perfect for finishing and high-volume production.
4. Maintaining the effectiveness of cutting tools requires regular sharpening.

Drawbacks

1. Cost: High upfront and recurring expenses.
2. Needs skilled operators to ensure precise operations.
3. Heat Generation: The properties of materials might be adversely affected by improper heat management.
4. Material restriction: Not suitable for extremely delicate or adhesive materials.

Applications

1. Manufacturing: Forming and polishing metal components for the equipment, automotive, and aerospace sectors.
2. Sharpening and maintaining drills, milling cutters, and cutting tools are part of the process of creating tools.
3. Polishing and finishing building materials like granite and marble.
4. Polishing and refining components for a clean finish is a step in the jewelry-making process.
5. Metal Fabrication: enhancing metal components through the elimination of defects such burrs and weld spatter.

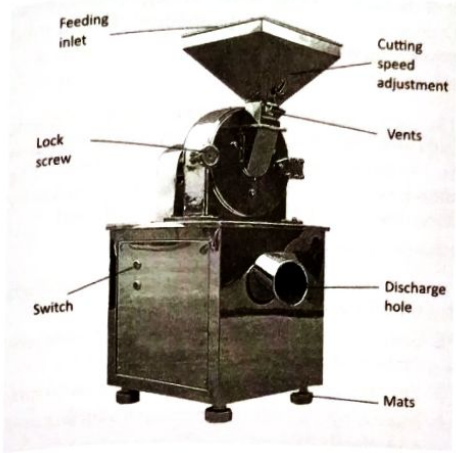
Disintegrator Machine

Definition

In order to convert materials into small particles or powders by grinding, crushing, or pulverizing them, a disintegrator machine is utilised. It is frequently used to break down materials into smaller, more manageable bits in sectors including chemical manufacture, food processing, medicines, and agriculture.

Principle

The disintegrator machine functions based on the impact and shearing action concept. It breaks the material into smaller pieces by employing high-speed rotors or blades that impact it forcefully. The material is effectively reduced in size by the combination of impact force and shearing action.



Use

Reducing the size of materials for additional processing is one of the main functions of disintegrator machines:

- Setting up the ingredients for chemical reactions.
- Making tiny powders for use in medication compositions.
- Crushing and grinding farm goods to make animal feed.
- Crushing food items to get a better consistency and texture.

Disintegrator Machine Types

1. **Hammer Mills**: Crush and hit the material using revolving hammers.
2. **Pin Mills**: These devices grind materials by using many pins on a revolving disc.
3. **Ball Mills**: Use impact and attrition to decrease material size by using revolving cylinders packed with grinding media.
4. **Jet Mills**: These mills crush materials into fine powders by using high-velocity air streams.
5. **Cage Mills**: Utilise impact bars and revolving cages to crush materials.

Working Procedure

1. The first step in the working procedure is preparation. Choose the right disintegrator machine for the material and desired particle size:
   - Verify that all safety precautions are taken and the machine is correctly built.
2. Material Loading:
   - Fill the feeding hopper or chute with the material.
   - Modify the feed rate to regulate the material's entry into the machine.
3. The disintegration process begins by starting the machine and letting the rotor or blades spin at their maximum speed:
   - The material is impacted by the high-speed rotors or blades when it enters the grinding chamber.
   - The material is broken into smaller particles by impact and shearing forces.
   - Keep going until the material has shrunk to the appropriate size.
4. Monitoring and Modifications: Keep an eye on the dissolution process to guarantee a constant particle size:
   - Modify the rotor speed, feed rate, or screen size as needed to get the required results.
5. Product Collection: Gather the broken-down material from the discharge port:
   - Handle and store the treated material using the proper techniques.
6. Shutdown and Cleanup: Switch the system off and give it time to stop completely:
   - To remove any remaining material, thoroughly clean the equipment. To ensure the machine's longevity and efficacy, do routine maintenance and inspections.

Benefits:

- **Efficiency**: Resources are swiftly converted to tiny particles, saving time and work.
- **Versatility**: Fits a variety of industries and materials.
- **Consistency**: Generates consistent particle sizes for trustworthy processing results.
- **Scalability**: Adaptable to varied production scales, available in many sizes.

Drawbacks:

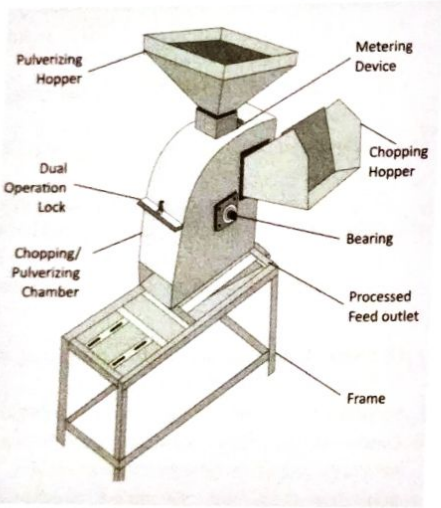
- **Energy Consumption**: This can be high, particularly for materials that are hard.

- **Maintenance**: To guarantee optimum performance and lifespan, frequent maintenance is necessary.
- **Noise and Dust**: May produce a lot of noise and dust, hence containment and ventilation are important.
- **Initial Cost**: For industrial-grade machinery, a large initial outlay is required.

Application

- **Pharmaceutical Sector**: Powdering excipients and active components for tablet compositions:
- **Food processing**: Crushing grains, spices, and other edibles to enhance flavour and texture.
- **Agriculture**: Grind grains and other feed ingredients to prepare animal feed.
- **Chemical Industry**: Powdering unprocessed materials to be used in formulations and chemical reactions.
- **Recycling**: Reducing waste materials, such metals and plastics, into small bits for easier handling and processing.

Pulverizer Machine



Definition

A pulverizer machine is a process used to crush, grind, or pulverise different materials into tiny particles or powder. For exact particle size reduction, it is broadly utilized in the mining, metallurgical, chemical engineering, pharmaceutical, and food processing sectors.

Principle

The mechanical force applied by high-speed rotors, grinding components, or other impact and friction techniques powers pulverizer machines. The material is broken down into lesser particles by these forces, and the fine powder is collected.

Use

1. Pulverizers are necessary to: Produce products with fine, consistent particle sizes.
2. Setting up raw materials for diverse businesses' further processing.
3. Enhancing food items' consistency and texture.
4. Increasing a chemical compound's surface area and reactivity.
5. Reducing materials to a manageable size in order to recycle them.

Pulverizer Machine Types

1. Hammer Mills
2. Ball Mills
3. Jet Mills
4. Roller Mills
5. Impact pulverizers

Working Process:

1. **Get ready**:
   - Based on the material and required particle size, select the suitable pulverizer.
   - Verify that all safety procedures are followed and the machine is appropriately installed.
2. **Material Loading**:
   - Fill the feed hopper or chute with the material.
   - Modify the feed rate to regulate the material's entry into the machine.
3. **The Grinding Procedure**:
   - Turn on the machine and give it time to run at maximum efficiency.
   - The material is compressed, exposed to friction, or struck when it enters the grinding chamber.
   - The material is broken down into fine particles by the grinding equipment (hammers, rollers, or grinding media).

   - Keep going until the material has the appropriate fineness.
4. **Monitoring and Modifications**: Keep an eye on the pulverisation procedure to guarantee uniform particle size.
   - As necessary, modify settings for the grinding element, feed rate, and rotor speed.
5. **Product Collection**: Gather the ground material from the discharge port.
   - Handle and store the fine powder with care using the proper techniques.
6. **Shutdown and cleanup**: Turn off the system and allow it enough time to finish shutting down.
   - Thoroughly clean the machine to remove any remaining material.
   - Perform routine maintenance and inspections to ensure the machine's longevity and efficiency.

Advantages:

- **Efficiency**: Provides quick and efficient size reduction for various materials:
- **Versatility**: Fits into a lot of different sectors and uses.
- **Consistency**: Generates consistent particle sizes for trustworthy processing results.
- **Scalability**: Adaptable to varied production requirements, available in many sizes.

Drawbacks

- **Energy Consumption**: This can be high, particularly for materials that are hard.
- **Maintenance**: To guarantee optimum performance and lifespan, frequent maintenance is necessary.
- **Noise and Dust**: May produce a lot of noise and dust, hence containment and ventilation are important.
- **Initial Cost**: Industrial-grade machinery requires a sizable initial investment.

Application:

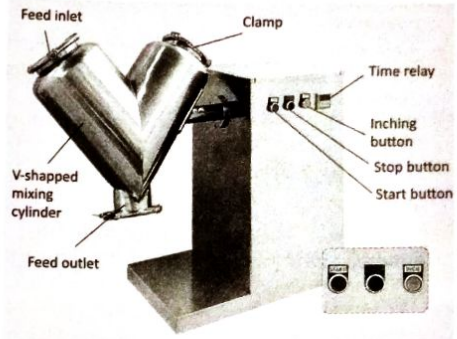
- **Mining and Metallurgy**: this involves crushing minerals and ores in preparation for extraction and additional processing.

Raw materials are ground for use in formulations and chemical reactions in the chemical industry:

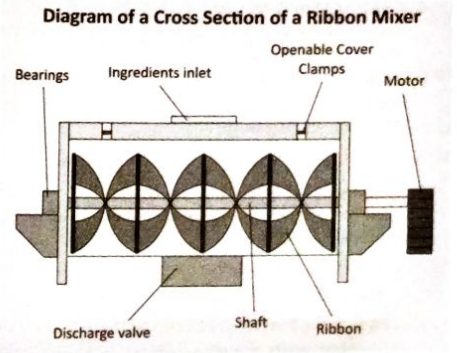
- **Pharmaceuticals**: The manufacturing of fine powders for tablets and further medical products.
- Food processing is the process of pulverising foods to enhance its flavour and texture, including grains, spices, and other components.
- **Agriculture**: Preparing animal feed and grinding agricultural products.
- **Recycling**: Reducing waste materials, such metals and plastics, into small bits for easier handling and processing

Powder Mixer Machine

a. V Type



b. Ribbon Mixer



Definition

To achieve a consistent composition, various powders are blended uniformly using a powder mixer machine. It is commonly employed to produce uniformity in powdered compounds in sectors including food processing, medicines, chemicals, and cosmetics.

Principle

The powder mixer machine works on the mechanical mixing concept, which calls for the movement of particles inside a small area in order to create a homogeneous blend. The machine fully mixes the powders using a variety of processes, including fluidized beds, tumbling movements, and revolving blades.

Utility

The following tasks need the use of powder mixers: Distributing components evenly throughout a combination:

- Creating standardised medication compositions.
- Blending food components to get a consistent texture and flavour.
- Combining substances to create uniform responses.
- Ensuring uniformity in cosmetic items.

Powder Mixer Machine Types

1. **V-Blenders**: Utilise a V-shaped chamber to tumbling and gravity-based mixing of particles.
2. **Ribbon Blenders**: These appliances twirl helical ribbons to combine particles in a horizontal manner.
3. **Tumbling Mixers**: To combine powders by tumbling, use revolving drums or containers.
4. **Conical Screw Mixers**: For both vertical and horizontal mixing, combine a conical form with an internal screw.
5. **Fluidized Bed Mixers**: These devices combine materials in a fluidized condition by using air or gas to fluidize them.

Working Process

1. **Preparation**: Depending on the kind of powders and required uniformity, choose the right powder mixer.
   - Verify that all safety precautions are taken and the machine is correctly built.
2. **Loading the Material**: Fill the container or mixing chamber with the powders:
   - Modify the load amount and feed rate in accordance with the machine's capabilities.
3. **The mixing process is as follows**: Turn on the machine and programme the time and speed of mixing:
   - To guarantee even blending, the powders are stirred by the mixing mechanism (blades, ribbons, tumbling action, etc.).
   - Keep an eye on the procedure to make sure the powders are well combined.
4. **Monitoring and Modifications**: To guarantee uniformity, keep a constant watch on the mixing process:
   - To get the desired consistency, adjust the mixing parameters (speed, time) as necessary.
5. **Product Discharge**: Turn off the machine when the mixing is finished:
   - Release the blended powder via the opening or receptacle.
   - Make sure that no powder remains in the mixing chamber after it has been collected.
6. **Shutdown and Cleanup**: Make sure the machine stops completely and turns off:
   - To remove any last traces of powder, give the instrument a thorough cleaning.

Advantages

- **Uniform Mixing**: This ensures a consistent and uniform mixing of powders:
- **Efficiency**: Takes less time to combine than manual techniques.
- **Versatility**: Fits a variety of powder applications and uses.
- **Scalability**: Adaptable to diverse production requirements, available in many sizes.

Drawbacks

- The energy usage of certain mixers might be high.
- Consistent maintenance is required to ensure peak performance.
- When there is inadequate cleaning in between batches, the risk of cross-contamination rises.

Pharmaceuticals

- Combining excipients with active pharmaceutical ingredients (APIs) to create tablets and capsules.
- Chemicals: Combining substances to create reliable formulations and reactions.
- Cosmetics: Mixing powdered materials to create skincare and cosmetic items, and other cosmetics.
- Agriculture: Preparing fertilizer blends and animal feed mixtures.

Mechanical Shifter Machine

Definition

Mechanical shifting machines, also known as sieves, are devices used in various sectors like agriculture, chemicals, food processing, and pharmaceuticals for granular material sorting and classification.

Principle

Particle size separation is the underlying concept that drives the mechanical shifter machine. It sifts particles by using a vibrating or rotating screen, keeping bigger particles on the surface and allowing smaller ones to flow through the perforations. Either rotational motion, mechanical vibrations, or both may be used to power this process.

Utility

Particle separation and size classification are two important uses for mechanical shifter machines.

Eliminating contaminants from large-scale materials:

- Assuring a consistent distribution of particle sizes in powders.
- Improving the uniformity and quality of the product.
- Readying supplies for additional handling or packing.

Mechanical Shifter Machine Types

1. **Vibrating Screens**: To move materials over the screen and separate particles, apply vibration.
2. **Rotary Screens**: To categorise particles, use a revolving drum with screen apertures.
3. **Gyratory Screens**: To aid in particle separation, use gyratory motion.
4. **Tumbler Screens**: For finer particle separation, use a little tumbling motion.
5. **Centrifugal Sifters**: Materials are pushed through the screen by centrifugal force.

Working Procedure

1. First, choose the right shifting machine by considering the material and the required particle size:
   - Verify that all safety precautions are taken and the machine is correctly built.
2. **Loading the Material**: Fill the feed hopper or chute with the material:
   - Modify the feed rate to regulate the amount of content that appears on the screen.
3. **Screening Procedure**: Turn on the machine and adjust the vibration or rotational speed to your liking:
   - Mechanical action causes material to move over the screen's surface, with larger particles staying on the surface and smaller ones flowing through perforations.
   - Keep going until all of the material has been screened.
4. **Monitoring and Modifications**: Keep an eye on the screening procedure to guarantee efficient separation:
   - Modify as necessary the feed rate, screen angle, and degree of vibration.
5. **Product Collection**: Gather the separated particles from the appropriate outputs:
   - Make sure the screened materials are handled and stored properly.

6. **Shutdown and Cleanup**: Switch the system off and give it time to stop completely:
   - The machine should be thoroughly cleaned to remove any remaining material and regularly maintained and inspected for its durability and effectiveness.

Benefits:

- **Efficiency**: Offers rapid and efficient separation of particles:
- **Versatility**: Adaptable to a broad spectrum of substances and particle sizes.
- **Consistency**: guarantees an even distribution of particle sizes.
- **Scalability**: Adaptable to diverse production requirements, available in many sizes.

Drawbacks

- **Energy Consumption**: Depending on the machine's capability, energy consumption may be substantial.
- **Maintenance**: To guarantee optimum performance, frequent maintenance is necessary.
- **Noise**: When operating, certain varieties might produce a lot of noise.
- **Initial Cost**: For industrial-grade machinery, a large initial outlay is required.

Applications

It involve size-based separation of excipients and active pharmaceutical ingredients (APIs), while food processing involves screening materials like wheat, sugar, and spices.

Chemicals

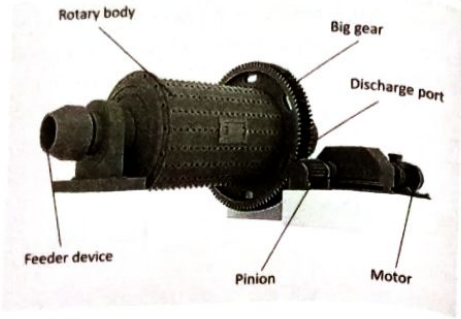
Sorting granules and powders containing chemicals:

- Agriculture: Grain, seed, and fertiliser separation.
- The process involves sorting minerals and ores for further processing, identifying recyclable materials, and classifying them accordingly.

Ball Mill

Definition

In mineral dressing processes, paints, pyrotechnics, ceramics, and selective laser sintering, materials are ground and blended in ball mills. It works by turning a cylinder filled with grinding balls, which fall back into the cylinder and land on the material that has to be ground.



Principle

The ball mill functions based on the impact and attrition principles. The material is crushed and ground into a fine powder as the cylinder spins, lifting up and dropping the grinding balls within. The material is continuously ground and mixed thanks to the continual spinning.

Use

Ball mills are necessary for:

- Pulverising substances to a very fine powder.
- Blending and combining substances.
- Obtaining superior particle size reduction; - Setting up materials for further processing in different sectors.
- Carrying out synthesis and mechanical alloying.

Various Ball Mill Types

1. **Planetary Ball Mills**: These are small ball mills with jars that revolve both around a central axis and their own, exhibiting planetary-like movement.
2. **Horizontal Ball Mills**: Conventional style using horizontal cylinder shape.
3. Cylinders in vertical ball mills are positioned vertically.
4. **Vibrating Ball Mills**: To improve the grinding process, apply vibrations.
5. **High-Energy Ball Mills**: Use high-energy impacts to create ultra-fine particles.

Working Process

1. **Preparation**: Select the right ball mill by considering the characteristics of the material and the intended end result.
   - Verify that all safety precautions are taken and the machine is appropriately built.

2. **Material Loading**:
   - Fill the cylinder with the material to be processed and the grinding medium (balls).
   - Make sure the ball-to-material ratio is right.
3. **Grinding Procedure**: Turn off the machine and begin spinning:
   - The material is ground into a fine powder by the balls falling upon it after the cylinder turns and lifts them.
   - To obtain the appropriate fineness, continue the procedure for the necessary amount of time.
4. **Monitoring and Modifications**: Keep an eye on the procedure to guarantee effective grinding:
   - If required, change variables like time, pace, and ball size.
5. **Product Discharge**: Close the mill and remove the cover:
   - Release the material from the mill that has been finely ground.
6. **Shutdown and Cleanup**: Make sure the machine stops completely and turns off:
   - Thoroughly clean the mill to get rid of any leftover material.
   - To guarantee lifespan and effectiveness, do routine maintenance and inspections.

Benefits

- **Versatility**: Adaptable to a variety of materials:
- **Efficiency**: Able to produce consistent, fine-grained particle sizes.
- **Scalability**: Adaptable to diverse production requirements, available in many sizes.
- **Consistency**: guarantees even blending and mixing.

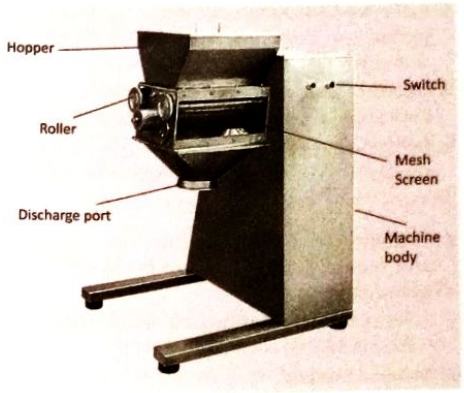
Drawbacks:

- **Energy Consumption**: This can be high, particularly in the case of large-scale activities.
- **Maintenance**: To guarantee optimum performance, frequent maintenance is necessary.
- **Noise**: When operating, it may produce a lot of noise.

Applications

- Pharmaceuticals involve powdering excipients and active pharmaceutical ingredients (APIs), while mineral processing involves grinding minerals and ores to separate them.
- **Paints and Pigments**: Generating homogeneous, fine particles for coating applications.
- **Ceramics**: Getting ready to manufacture ceramic powders.
- **Chemical Industry**: Powdering chemicals for use in formulations and reactions to a fine powder.
- **Pyrotechnics**: Making powders that have been finely pulverised for explosives and pyrotechnics.

Granulator Machine



Definition

Granulator machines are devices that break down bigger, bulk materials into uniformly sized grains or pellets. Particles formed from liquids, powders, or large solids are often used in a variety of sectors, including polymers, chemicals, food processing, medicines, and farming.

Principle

Agglomeration, the process by which smaller particles aggregate to produce bigger, more uniform granules, is the fundamental idea behind how granulators work. Depending on the kind of granulator, this process can be completed by mechanical compression, extrusion, or fluidized bed.

Practicality

Enhancing material handling and flowability are two major uses for granulator machines.

Improving the products' consistency and homogeneity:

- Raising the material's bulk density.
- Making dosing and packaging procedures easier.
- Cutting down on dust and enhancing security when handling materials.

Granulator Machine Types

1. **Rotary Drum Granulators**: To agglomerate materials into granules, use revolving drums.
2. **Fluidized Bed Granulators**: To suspend and agglomerate particles, use fluidized air.
3. **Oscillating Granulators**: To create granules, force powder through a screen using oscillating rotors.
4. **Extrusion Granulators**: Produce homogenous pellets or granules by forcing materials through a die.
5. **High-Shear Granulators**: To combine and granulate materials, use high-speed mixing blades.
6. **Roller Compaction Granulators**: To compact powders into granules, use compression rollers.

Working Procedure

1. **Preparation**: Depending on the material and required granule size, choose the right granulator:
   - Verify that all safety precautions are taken and the machine is correctly built.
2. **Material Loading**:
   - Place the raw material (bulk solids, liquid, or powder) into the feed hopper of the granulator.
   - To regulate the amount of material that enters the granulating chamber, adjust the feed rate.
3. **The Granulation Process:**
   - Turn on the machine and adjust the operational settings (such as pressure, temperature, and speed).
   - The fluidization or mechanical action of the machine agglomerates the material into granules.
   - Keep going until the material is transformed into evenly sized granules.
4. **Monitoring and Modifications**: Keep an eye on the granulation procedure to guarantee consistency and homogeneity:
   - Modify variables like temperature, pressure, or speed as needed to get the right granule size and quality.
5. **Product Discharge**: Turn off the machine and let the granulated material come out of the opening:
   - To preserve quality, make sure the granules are handled and stored properly.
6. **Shutdown and Cleanup**: Make sure the machine stops completely and turns off:
   - The machine should be thoroughly cleaned to remove any remaining material and regularly maintained and inspected for its durability and effectiveness.

Benefits

Granules offer better material handling due to their ease of handling, movement, and storage compared to powders.

Uniformity: guarantees a constant composition and size of particles.

The process enhances cleanliness and safety by reducing dust production, while also providing greater control over the physical characteristics of the finished product.

Drawbacks:

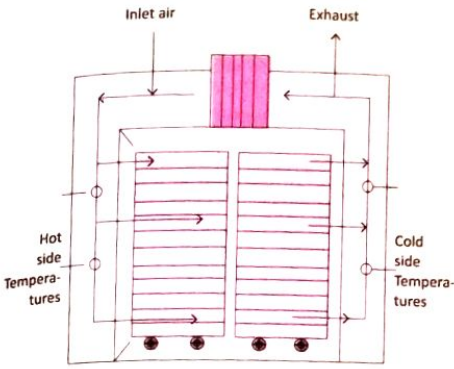
- **Energy Consumption**: The energy usage of certain granulators might be high.
- **Maintenance**: To guarantee optimum performance, frequent maintenance is necessary.
- **Initial Cost**: For industrial-grade machinery, a large initial outlay is required.
- **Complexity**: A sophisticated setup and expert operators may be necessary for certain granulators.

Applications

It involve grinding excipients and active pharmaceutical ingredients (APIs) to create tablets and capsules:

- The process involves pulverizing discarded plastic into consistent granules for further processing.
- Grind components and powders for better consistency and handling.
- Making pellets for animal feed and fertiliser.
- Powdered chemicals are finely ground to increase reactivity and flowability.
- Making consistent granules for formulas used in cosmetics.

Dryer



Definition

A dryer is a device used to remove moisture or water from gases, liquids, or solids, commonly used in homes and enterprises for processing, preservation, or other applications.

Principle

Evaporation, the act of taking moisture out of a material by heating it, exposing it to air, or employing another drying agent, is the basis for how dryers operate. Heat and airflow assist in evaporating moisture, which is then vented out of the dryer.

Use

- Improving product stability and shelf life.
- Setting up supplies for further processing or packing.
- Improving the quality of the product by managing the moisture content.
- Lowering weight to save money on shipping (in the case of solids).

Different Dryer Types

1. **Hot Air Dryers**: Utilise forced convection to dry things using heated air.
2. **Fluidized Bed Dryers**: Utilising hot air to force solid particles through a perforated plate, these particles are dried while they float or circulate.
3. **Spray Dryers**: These devices atomize liquid supply into tiny droplets, which are then quickly evaporated in a heated chamber to achieve drying.
4. **Rotary Dryers**: To tumble and dry materials using direct or indirect heat, use revolving drums or cylinders.
5. **Vacuum Dryers**: Utilise low pressure to dry materials quickly and lower the boiling point of water.
6. **Freeze Dryers (Lyophilizers)**: By managing the moisture content, these devices preserve the structure and qualities of materials by freezing them and subsequently removing ice by sublimation under vacuum:
   - Lowering weight to save money on shipping

Working Process

1. **Material Loading**:
   - Fill the chamber, conveyor, or holder of the dryer with the damp or wet material.
2. The drying process entails turning on the dryer and adjusting the temperature, airflow rate, and humidity level as needed:
   - Use heat or air movement to help the material's moisture evaporate.
   - Keep an eye on the drying process to avoid overheating and guarantee even drying.
3. **Moisture Removal**: Moisture evaporation happens when the material dries, and the moisture might escape through the dryer's vents or exhausts. To determine when drying is finished, monitor the moisture content of the material.
4. **Cooling and Discharging**: After the material has dried, if necessary, refrigerate it to prevent moisture absorption once again:
   - Release the dried material onto a conveyor or dryer outlet for further processing or storage.
5. **Maintenance and Shutdown**: After turning off, allow the dryer to cool:
   - Remove any remaining material from the belt and chamber of the dryer.
   - Regular maintenance and inspections.

Benefits:

- Decreases moisture content in materials quickly.
- Increases a product's stability and shelf life.
- Maintains a constant moisture content in the product to ensure quality.

- Comes in many varieties to suit a range of materials and drying needs.

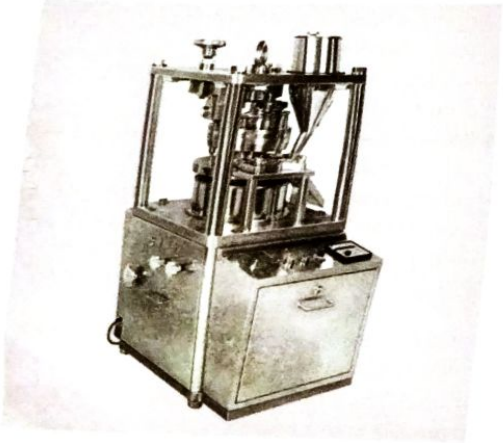
Drawbacks:

- **Energy Consumption**: Depending on the dryer's capacity, this might be a major energy user.
- **Maintenance**: In order to guarantee efficiency and avoid malfunctions, frequent maintenance is necessary.
- **Initial Cost**: Industrial-grade dryers require a large initial outlay of funds.
- **Uniformity of Drying**: For some materials, especially, it may be challenging to guarantee uniform drying.

Application:

- Preserving food by drying fruits, vegetables, cereals, and spices.
- Stability-checking formulations and active pharmaceutical ingredients (APIs) during drying.
- Chemicals and intermediates that need to be dried for additional processing.
- Paper goods and pulp are dried.
- After washing, drying clothes and materials.
- Prior to moulding or extrusion procedures, plastic pellets must be dried.

Tablet Compressing Machine



Definition

In the pharmaceutical industry, a tablet compressing machine, also known as a tablet press or compression machine, is a automated method used to wrapping powder or granules into standardized tablets.

Principle

The compression concept underlies the operation of tablet compressing devices. They compress material that is powdered or granulated into tablet shape by applying pressure to it using punches and dies. The machine controls the size of the tablets and the pressure used in order to ensure consistency.

Use

For the manufacture of pharmaceutical tablets, including over-the-counter and prescription medications, tablet compressing machineries are necessary:

- Manufacture vitamin and nutritional supplement tablets.
- Creating compressed tablet formulations for use in agriculture and industry.
- Ensuring consistency and accurate dosage of pills.
- Making it easier to handle and provide prescription drugs.

Tablet Compressing Machine Types

1. One tablet at a time is processed by the Single Station Tablet Press.
2. **Multi-Station Rotary Tablet Press**: This device spins to compress many tablets at once.
3. **High-Speed Tablet Press**: This device produces more at a faster pace by running at a faster speed.
4. **Bilateral Tablet Press**: To maximise production, use punches on both sides.
5. **Mini Tablet Press**: This device creates little tablets or pills.
6. **Hydraulic Tablet Press**: Compresses data using hydraulic pressure.

Working Procedure

1. **Preparation**: Choose the suitable tablet press according to the specifications and needs of the production.
   - Make that the machine is properly configured with the right dies and punches.
2. **Loading the Material**: Fill the tablet press's hopper with the powdered or granulated material (typically mixed with binders and lubricants):

   - The process of compression involves starting the tablet press and modifying the parameters related to compression force, speed, and tablet size.
   - Feeding the material into the die cavity allows higher and lower punches to compress it.
3. The tablet is created through the application of pressure and then expelled from the die.
4. **Monitoring and Adjustments**: Monitor the compression process to ensure tablets' size, weight, and hardness are within the specified parameters:
   - To maximise tablet quality, adjust settings like fill depth or compression force as necessary.
5. **Tablet Collection**: Gather the assembled tablets from the conveyor or discharge chute:
   - Examine tablets for flaws or irregularities, discarding those that don't live up to expectations.
6. **Shutdown and Cleanup**: Turn off the machine and give the dies, punches, and hopper a regular cleaning:
   - Conduct routine maintenance and lubrication to guarantee the machine's durability and dependability.

Benefits:

- **Accuracy**: Generates pills with consistent dose, size, and weight.
- **Efficiency**: High rates of manufacturing for substantial tablet volumes.
- **Control**: Provides exact control over the composition and properties of tablets.
- **Automation**: Lowers human error and labour expenses.

Drawbacks:

- Buying and configuring a tablet press requires a significant initial outlay of funds.
- Needs frequent maintenance and expert operators.
- Cleaning in between batches or switching to a different formulation takes time.
- Extra expenses related to the acquisition and upkeep of dies and punches.

Applications:

- Producing vitamins, supplements, and medicine pills.
- Making herbal items and nutritional supplements in tablet form.
- Industrial Use: Creating tablets with industrial and agricultural chemicals.
- Cosmetics: Pressing powders into tablets for makeup and skincare items.

Pill Making Machine (Tablet Press)

Definition

A tablet press is a device that uses punches and dies to compress materials into pills. It uses a hopper, punches, and dies to shape and size the material uniformly while operating on the principles of compression.

Principle

Compression

Uses

- This substance is used for mass-producing pharmaceutical tablets, dietary supplements, vitamins, and industrial and agricultural purposes.
- Ensuring accurate dosage and homogeneous tablet compositions.

Types of Tablet Presses

1. **Single Station Tablet Press**: Processes just one tablet at a time.
2. **Rotary Tablet Press**: Rotates to crush numerous tablets at once, enhancing manufacturing efficiency.
3. **High-Speed Tablet Press**: Capable of producing huge quantities at faster speeds.
4. **Bilateral Tablet Press**: Utilises punches on both sides to boost productivity.
5. **Mini Tablet Press**: Tiny tablets or mini-pills.
6. **Hydraulic Tablet Press**: With the use of hydraulic pressure, Compressed is achieved.

Working Procedure

1. **Preparation**: Choose a suitable tablet press depending on tablet specs and production needs:
   - Set up the machine with the appropriate punches and dies.
2. **Loading the Material**: Place powdered or granulated material in the tablet press's hopper:
   - Add binders, lubricants, or other excipients as needed.

3. **Compression Process**: Start tablet press and modify parameters for force, speed, and dimensions:
   - The material is fed into the die chamber and crushed between the upper and lower punches.
   - Pressure is employed to produce tablets of uniform size, shape, and weight.
4. **Monitoring and Adjustments**: Monitor tablet compression to verify hardness, thickness, and weight parameters are met:
   - To improve tablet quality, adjust settings like compression force and fill depth.
5. Collect the produced tablets from the discharge chute or conveyor:
   - Inspect tablets for flaws or discrepancies and discard those that do not satisfy quality requirements.
6. **Shutdown and Cleanup**: Rest the machine and clean the dies, punches, and hopper between sets.
   - Keep the machine by regular maintenance and lubrication.

Advantages

Produces pills with accurate and consistent dose:

- **Efficiency**: High manufacturing rates for big batches of tablets.
- **Control**: Provides exact control over tablet composition and properties.
- **Automation**: Lowers labour expenses and reduces human error.

Disadvantages:

- The purchase and setup of a tablet press requires a significant upfront cost.
- Requires expert operators and frequent maintenance.
- Changing formulas or cleaning between batches takes time.
- Additional expenses for acquiring and maintaining dies and punches.

Applications:

- For nutritional supplements and herbal goods.
- For agricultural chemicals and industrial materials.
- Powders are compacted into tablets for skincare and cosmetic items.

Coating Pan Machine

Definition

A coating pan machine is an equipment used to put a thin layer of coating material on solid objects (such tablets, pills, or sweets) in the food processing, chemical, and pharmaceutical industries.

The coated items look better, taste better, and are more stable after this treatment.

Principle

The working premise of coating pan machines is to apply a coating material to a product's surface by rotating the object while simultaneously applying the coating solution. The product to be coated is placed inside a rotating pan and covered with the coating solution, which is poured or sprayed on, to guarantee uniform coverage.

Utility

One of the primary applications of coating pan machines is to enhance the visual attractiveness of tablets, pills, and confections.

- Covering up the bad tastes or smells of prescription drugs.
- Offering a shield to stop deterioration and increase stability.
- Enabling enteric coating or controlled release for medications.

Enhancing the look and texture of food items.

Coating Pan Machine Types

1. **Perforated Coating Pan**: This type of pan or drum has holes in it to facilitate effective coating and drying.
2. **Non-Perforated Coating Pan**: This method applies coating material uniformly using a solid pan or drum.
3. **Fluidized Bed Coating Machine**: This device coats materials in a regulated environment by fluidizing particles.
4. **Accela-Cota Coating Machine**: Using a perforated pan and regulated drying, this machine offers effective coating.

Working Process

1. **Product Loading**: Insert the coated goods (tablets, pills, etc.) into the coating pan machine.
2. **Coating Solution Preparation**: Make the coating solution or suspension in accordance with the specifications of the formulation, which may call for the addition of colourants, polymers, and other additives.
3. **Coating Procedure**: Turn on the coating pan's rotation:
   - Spray or pour the coating solution onto the spinning items gradually.
   - Make sure the items' surfaces have a uniform distribution of the coating solution.
4. **Drying and Curing**: Keep turning the pan to enable the coating material to dry and cure:
   - Modify airflow and temperature as needed to promote drying.
5. **Monitoring and Adjustments**: Keep an eye on the coating procedure to make sure the coating material is adhered to and covered uniformly:
   - As necessary, modify settings including drying conditions, spray rate, and rotation speed.
6. **Discharge and Collection**: When the required coating thickness is reached, stop the machine:
   - Remove the coated goods from the coating pan so they may be packaged or processed further.
7. **Shutdown and Cleanup**: Thoroughly clean the coating pan machine to get rid of any last bits of coating:
   - Conduct regular upkeep and inspections to guarantee the machine's effectiveness.

Benefits:

- **Improved Product Appearance**: Enhances tablets, pills, and confections' visual attractiveness:
- **Protection and Stability**: Increases stability and shelf life by offering a protective layer.
- **Controlled Release**: Permits enteric coating or controlled release in pharmaceutical goods.
- **Customisation**: Enables the alteration of textures, flavours, and colours.

Drawbacks

- Needs attentive supervision and knowledgeable operators.
- The coating procedure might take a while, particularly when working with big batches.
- It might be difficult to guarantee a consistent coating thickness on all goods.
- Both the initial outlay and ongoing maintenance requirements might be high.

Applications

Coating tablets and capsules to enhance their durability, flavour, and appearance:

- Coating nuts, chocolates, and sweets to improve their flavour and look.
- Chemicals: Coating particles and granules for protection and controlled release.
- Nutraceuticals: Encasing dietary supplements and vitamins to increase acceptability among consumers.

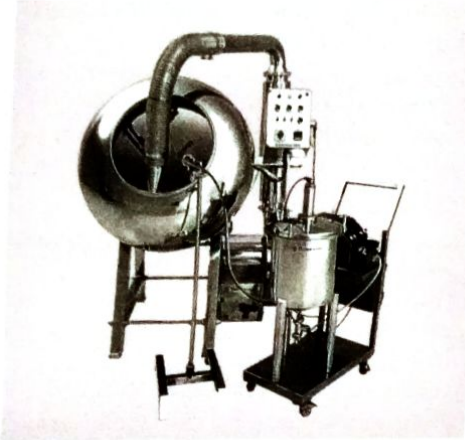
Polishing Pan Machine

Definition

A polishing pan machine is a type of machinery used to polish and improve the surface of items in the food processing, pharmaceutical, and cosmetics sectors. To provide a smooth and glossy finish, it works by tossing the items with polishing chemicals inside a spinning pan or drum.

Principle

The working concept of polishing pan machines is mechanical abrasion and friction. The objects that need to be polished are put within the pan together with potential polishing chemicals and polishing medium (beads, granules, or powders). The products create a polished surface by rubbing against the media and one another as the pan rotates.



Use

Polishing pan machines are necessary for: Enhancing the visual appeal and aesthetic calibre of goods:

- Eliminating rough edges, scratches, and surface flaws.
- Improving the smoothness and sheen of pills, tablets, and other solid substances.
- Getting goods ready for packing or additional processing.

Polishing Pan Machine Types

1. **Rotary Polishing Pan**: Products and polishing media are tumbled using a revolving pan or drum.
2. **Vibratory Polishing Pan**: This tool uses vibratory motion to polish objects, particularly those that are smaller and more delicate.
3. **High-Speed Polishing Pan**: Designed to efficiently polish big quantities at greater speeds.

Working Process:

1. **Loading the goods**: Insert the goods (pills, tablets, etc.) that need to be polished into the polishing pan machine.
2. **Adding Polishing Media**: Fill the pan with polishing media (beads or granules) and any necessary polishing agents.
3. **Polishing Procedure**: Turn on the polishing pan machine by rotating or vibrating it:
   - The goods fall into the pan and make contact with the compounds and polishing medium.
   - Imperfections are removed from the surfaces by abrasion and friction between the goods and media.
4. **Monitoring and Adjustments**: Keep an eye on the polishing procedure to guarantee consistent polishing and the appropriate level of surface quality:
   - For best outcomes, modify variables like vibration strength or rotation speed as necessary.
5. **Discharge and Collection**: When the machine reaches the appropriate level of polishing, stop it:
   - Take the polished goods out of the polishing pan so they may be packaged or processed further.
6. **Shutdown and cleanup**: Clean the media and polishing pan machine to get rid of any leftover particles or residue:
   - To preserve machine efficiency, do periodic maintenance and inspections.

Benefits:

- **Enhanced Aesthetic Quality:** Boosts the lustre and look of items:
- **Surface smoothing**: Eliminates rough edges and surface defects.
- **Consistency**: Makes sure that every product has the same level of polishing.
- **Efficiency**: Completes big product batches in a comparatively short amount of time.

Drawbacks

Wear on the surfaces of fragile objects due to abrasion concerns:

- **Media Replacement**: Polishing media must be changed on a regular basis.
- **Skill Requirement:** In order to maximise polishing outcomes, operators require training.

Applications:

- **Pharmaceuticals:** Polishing tablets and pills to enhance their look and acceptability by customers:
- **Cosmetics**: For a smoother finish, polish solid cosmetic items and powders.

- **Food Industry**: Applying polish to chocolates, coated nuts, and sweets to improve their look.
- **Manufacturing**: Increasing the surface quality of industrial items and components by polishing.

End Runner Machine

Definition

An end runner machine, often referred to as an edge runner or roller stone mill, is a kind of mechanical milling apparatus that is used to combine and grind different materials into a uniform combination. The end runner mill crushes and grinds the material put into it using large steel or granite rollers positioned on a horizontal shaft.

Principle

The end runner machine functions based on the principles of impact and shear milling. The material to be processed is fed into the mill in between the rollers, where the weight and rolling motion of the heavy rollers crush and grind the material. Size reduction and mixing occur from the material being subjected to strong shear pressures and friction between the rollers and the mill base.

Utility

The main uses of end runner machines are as follows: Grinding and pulverising substances into fine pastes or powders:

- Blending and mixing substances to create uniformity.
- Processing materials that need to be crushed or kneaded because they are sticky or damp.
- Manufacturing chemical substances, food items, cosmetics, and medications.

End Runner Machine Types

1. **Single End Runner Mill**: Centered Around a horizontal shaft, this mill has a single heavy roller.
2. **Double End Runner Mill**: For more effective grinding and mixing, this mill has two large rollers that rotate in opposing directions.

Operational Process

1. **Loading the Material**: Place the material between the rollers in the centre of the mill.
2. **Crushing and Blending**: Initiate the rollers' rotation, which breaks and blends the material as it approaches the edge:
   - The rollers' weight and rolling motion continually smash and mix the material.
3. **Modifications and Observation**: Modify the rotational speed to regulate the product's fineness:
   - Keep an eye on the procedure to guarantee that the item is ground and mixed uniformly.
4. **Product Discharge**: Expel the processed material from the mill as soon as the required homogeneity or particle size is reached.
5. **Maintenance and Cleaning**: To avoid cross-contamination between batches, carefully clean the mill after each usage:
   - Keep the equipment well-maintained to guarantee life and smooth functioning.

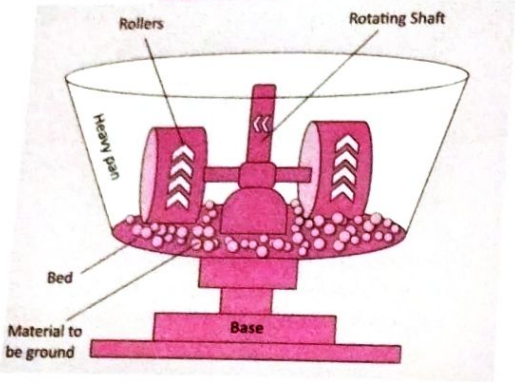
Benefits

- **Effective Grinding**: The hefty roller design effectively crushes and grinds materials.
- **Mixing Capability**: Able to combine and mix substances to provide consistency.
- **Versatility**: Appropriate for handling a wide range of materials, including sticky or damp ones.
- **Sturdy Construction**: Made with sturdy materials for extended usage.
- **Drawbacks**: High electricity Consumption: Because of the heavy rollers, operation requires a large amount of electricity:
- **Area Requirement**: Takes up more floor area than other milling machines.
- **Maintenance Requirements**: To maintain rollers and bearings, frequent maintenance is necessary.
- **Initial Cost**: Compared to simpler milling machines, this requires a larger initial expenditure.

Applications:

- **Pharmaceutical Industry**: Preparing and blending components for formulations into tablets and capsules.
- **Cosmetics Industry**: Preparing components for lotions, ointments, and cosmetics.
- Grains, spices, and other food components are mixed and ground in the food industry.
- **Chemical Industry**: Manufacturing pastes and chemical compounds.

Edge Runner Machine



Definition

An edge runner machine, often referred to as a runner stone mill, is a kind of grinding mill that has two large rollers made of granite or steel that are positioned on a horizontal shaft and rotated around a central vertical shaft. Ores, coal, stone, and pigments are just a few of the materials that these rollers are used to crush and grind.

Principle

The edge runner machine works on the basis of heavy rollers moving around a horizontal shaft and a fixed base, which creates friction that grinds and mixes materials. The mill's side or center are where the material to be processed is fed. Size reduction and mixing are the outcomes of the material being crushed and ground against the base by the rotating rollers.

Utility

The following are the main uses of edge runner machines: Crushing and grinding materials into fine pastes or powders:

- Blending and mixing substances to create consistency.
- Handling sticky or moist items that need to be crushed or kneaded.
- Making different industrial chemicals, ceramics, dyes, and pigments.

Edge Runner Machine Types

1. **Single Edge Runner Mill**: Centered on a horizontal shaft, this mill has a single heavy roller.
2. **Double Edge Runner Mill**: For improved grinding and mixing efficiency, this mill has two heavy rollers that rotate in opposing directions.

Working Process:

1. **Loading the Material**: Feed the material between the rollers in the centre or side of the mill.
2. **Grinding and Mixing**: Initiate the rollers' rotation, which presses the material up against the fixed base to grind and crush it.
   - Because of the rollers' pressure and friction, the material is continuously ground and mixed.
3. **Modifications and Observation**:
   - Modify the rotational speed to regulate the product's fineness.
   - Keep an eye on the procedure to guarantee that the item is ground and mixed uniformly.
4. **Product Discharge**: Expel the processed material from the mill as soon as the required homogeneity or particle size is reached.
5. **Maintenance and Cleaning**: To avoid cross-contamination between batches, carefully clean the mill after each usage:
   - Keep the equipment well-maintained to guarantee life and smooth functioning.

Benefits:

- **Efficient Grinding**: Because of the hefty roller design, materials are crushed and ground efficiently.
- **Mixing Capability**: Able to combine ingredients to a homogeneous consistency.
- **Versatility**: Appropriate for handling a variety of materials, including sticky or damp ones.
- **Sturdy Construction**: Made with sturdy materials for extended usage.

Drawbacks:

- **High electricity Consumption**: Because of the heavy rollers, operation requires a large amount of electricity.
- **Area Requirement**: Takes up more floor area than other grinding machines.
- **Maintenance Requirements**: To maintain rollers and bearings, frequent maintenance is necessary.
- **Initial Cost**: More expensive than more basic grinding equipment at first.

Applications:

- **Chemical Industry**: Dissolving and blending dyes, ceramics, and pigments.

- **Mining Industry**: Minerals and ores are crushed for extraction methods.
- **Construction resources**: converting unprocessed resources into finished building supplies.
- **Ceramics and Pottery**: Preparing materials for the creation of ceramics.

Capsule Filling Machine

Definition

A capsule filling machine is a specialized mechanical tools used to automatically fill empty gelatin or vegetarian capsules in the pharmaceutical and nutraceutical industries. Fundamental:

Principle

The basis of capsule filling machines' process is accurate dosing and encapsulation. To manufacture completed capsules, they employ mechanisms to sort and arrange empty capsules, fill them with the necessary material, and seal them. In order to fulfill with pharmaceutical desires, the machines maintain hygiene and assurance dose similarity.

Use:

- Pharmacies that fill prescription capsules in bulk.
- Producing vitamin and nutritional supplement tablets.
- Ensuring precise dosing and uniformity in capsule contents.
- Adhering to legal specifications for dosing accuracy and product safety.

Capsule Filling Machine Types

1. Manual Capsule Filling Machine
2. Semi-Automatic Capsule Filling Machine
3. Fully automated capsule filling machine
4. Capsule Filling Machines by Capsule Size

Working Process:

1. **Loading the capsules**:
   - Empty capsules are manually inserted into slots or put into the feeding mechanism of the machine.
2. **Capsule Orientation and Separation**: The apparatus divides the capsules into caps and body sections.
3. **Filling Station**: The capsules are filled with the exact amount of a liquid, granular, or powdered ingredient by the filling station.
4. **Closing the Cap**: The filled capsules are sealed either by employing a sealing mechanism or by squeezing the cap and body together.
5. **Ejection and Collection**: Upon completion, the capsules are extracted from the apparatus and gathered for additional handling or packing.
6. **Cleaning and Maintenance**: The equipment undergoes meticulous cleaning between batches to prevent cross-contamination, ensuring its longevity and optimal performance through consistent maintenance.

Benefits:

- **Accuracy and Precision**: Guarantees a constant dose in every pill.
- **Efficiency**: Automated filling procedures increase manufacturing speed.
- **Quality Control**: Upholds hygienic and sanitary requirements.
- **Flexibility**: Adapts to different filler materials and capsule sizes.

Drawbacks:

- Higher upfront costs as compared to hand filling techniques.
- Needs frequent maintenance and skilled operators.
- It might take some time to clean in between batches.

- Certain machines can only handle a certain size of capsule.

Applications:

- Producing drugs in pill form for oral use.
- Making convenient vitamin and nutritional supplement encapsulations.
- Packing skincare product components into capsules for cosmetic use.
- Botanicals and herbal extracts encapsulated for use as herbal supplements.

Ointment Mixer Machine

Definition

A specialist device used in the culinary, cosmetic, and pharmaceutical industries, an ointment mixer machine standardizations and mixes semi-solid ingredients, particularly pastes, gels, ointments, and creams. These tools enable the complete blending of components, ensuing in a more homogeneous and high-quality final product.

Principle

Ointment mixers work by means of mechanical agitation and mixing. Using rotating paddles or blades, they mix and knead semi-solid ingredients in a jar or container. When all the elements are dispersed equally, as the mixing process ensures, a homogenous mixture is created.

Working Process:

1. **Loading the components**: Fill the mixing vessel or container with the necessary semi-solid components.
2. When the mixer is turned on, the paddles or blades inside the vessel begin to rotate, initiating the mixing process:
   - The agitation and kneading action of the blades fully mixes and blends the materials.
   - To attain the necessary consistency, modify the speed and duration of mixing in accordance with the formulation criteria.
3. **If necessary, heating or cooling**:
   - Certain ointment mixers have the capacity to heat or cool, allowing the temperature to be changed while mixing certain formulas.
4. **Discharge of Mixture**: Remove the mixture from the machine for additional processing or packing after mixing is finished and a consistent consistency is reached.
5. **Maintenance and Cleaning**: After using the mixer, give it a full vacuuming to evade cross-contamination concerning batches:
   - Perform routine maintenance to guarantee that motor parts, seals, and blades are operating properly.

Benefits

Uniform mixing, which guarantees a constant ointment and cream quality and texture:

- **Efficiency**: Lowers the amount of time and human labour needed for mixing tasks.
- **Versatility**: Able to work with a variety of formulations and viscosities.
- **Hygiene**: Prevents contamination during manufacturing and upholds cleanliness.

Drawbacks

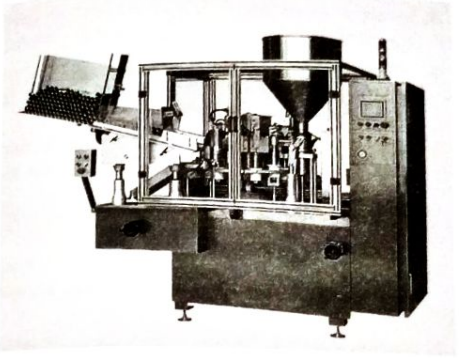
- **Complexity**: Requires knowledgeable personnel for maintenance, operation, and setup.
- **Initial Cost**: More expensive than hand mixing techniques.
- **Requires Space**: Takes up floor space in manufacturing facilities.
- **Cleaning Time**: It might take some time to clean in between batches.

Application

- Production of gels, creams, and ointments for topical drugs.
- Manufacturing face masks, lotions, and creams for skincare.

- Blending dressings, pastes, and sauces for food items.
- Creating industrial adhesives and pastes.

Tube Filling Machine



Definition

A tube filling machine is a crucial tools in the food, cosmetic, and pharmaceutical sectors, used to precisely and firmly fill and seal various materials for trade and distribution.

Principle

Volumetric or piston filling is the source for by what means tube filling machines work. They precisely distribute a set amount of product into each tube using mechanisms. Afterward, the tubes are folded or sealed with caps to maintain product reliability and guard contrary to contamination.

Use:

- The process involves filling tubes with dental paste, lotions, and medicinal ointments, as well as cosmetics like gels, lotions, and creams for retail sales.
- Placing food items in squeezable tubes, such as toothpaste, sauces, and condiments.
- Safeguarding sanitary packaging and precise dose for semi-solid materials.

Tube Filling Machine Types:

1. Automatic Tube Filling Machine
2. Semi-Automatic Tube Filling Machine
3. Rotary Tube Filling Machine
4. Hot Air Tube Sealing Machine

Working Process:

1. **Tube Feeding**: Tubes are manually inserted into slots or put into the machine's feeding mechanism.
2. **Filling Station**: The filling station carefully measures out the amount of product to put into each tube.
   Pneumatic pumps and volumetric filling systems ensure precise dosing based on product viscosity and tube diameter.
3. **Sealing Station**: Tubes are sealed using heat sealing, ultrasonic sealing, or crimping processes. Sealed tubes are taken out of the machine and packed or processed further.
4. **Optional Coding and Marking**: Some devices allow tubes to be marked or coded with product information, batch numbers, or expiration dates.
5. **Maintenance and Cleaning**: Make sure to thoroughly clean the equipment to avoid cross-contamination after every usage. Perform routine maintenance to make sure the filling and sealing mechanisms are operating as intended.

Benefits:

- Guarantees uniform tube filling and sealing.
- Lowers labour expenses and speeds up production.
- Keeps product packaging hygienic and free of contamination.
- Adapts to different product viscosities and tube diameters.

Drawbacks:

- More expensive than filing forms by hand.
- Setup and operation require qualified operators.
- Seals and machine parts require routine maintenance.
- The range of tube diameters that some machines can handle may be restricted.

Application:

- Containers for topical drugs, such lotions and ointments.
- Stuffing skincare items like gels and lotions into tubes.

- Packaging in squeezeable tubes for pastes, sauces, and condiments.

Transferring sealants, adhesives, and lubricants into tubes.

Sieves and Meshes

Definition

To separate particles of different sizes, devices or materials having uniformly spaced apertures are called sieves or meshes. For the analysis of particle size, filtration, and material categorization according to size distribution, they are indispensable instruments in many different sectors.

Principle

The utilization of woven wire, perforated plates, or electroformed sheets with regular apertures forms the foundation of sieve and mesh technology. Smaller particles go through the sieve while bigger particles are trapped on the sieve. The range of particle sizes that may be separated or examined depends on the size of the apertures.

Utility

- Particle size analysis in labs and industry is the main use for sieves and meshes.
- Filtration and the removal of particles from gases or liquids.
- Sorting items according to various size fractions.
- Quality assurance and control in production procedures.

Sorts of Meshes and Sieves:

1. **Woven Wire Mesh**: Made up of uniformly sized metal wire strands woven together.
2. **Perforated Plate**: Made of metal plates with holes punched into them of a certain dimension.
3. **Electroformed Sheet**: Specifically shaped apertures are produced by electroforming metal.
4. **Micro porous Membrane**: This type of membrane uses artificial materials with tiny holes to provide accurate filtering.
5. **Laboratory Test Sieves**: Standardized sieves that meet ASTM or ISO standards are utilised for particle size examination.

Working Procedure:

1. **Sieve selection**: Select a mesh or sieve whose apertures correspond to the intended range of particle sizes.
2. **Loading Material**: Spoon or stack the material to be filtered or examined onto a sieve.
3. The sieving procedure involves shaking or tapping the sieve stack to move the material around:
   - Smaller particles flow through to lower sieves or collection pans, while larger particles stay on top of the sieve.
4. **Analysis or Collection**: To ascertain the particle size distribution, gather and examine the particles that are retained after passing through each sieve.
   - Gather the separated materials or filtered liquid from the collecting pan or bottom sieve.
5. **Upkeep and Cleaning**: After using sieves, clean them to get rid of any leftover particles and stop cross-contamination.
   - Regularly check sieves for deterioration and replace them

Benefits:

- **Accuracy**: Offers accurate separation and analysis of particle size.
- **Versatility**: Available in a range of configurations and materials to suit diverse needs.
- **Efficiency**: Quick material screening and analysis in large volumes.

- **Standardization**: For consistent outcomes, adhere to international norms.

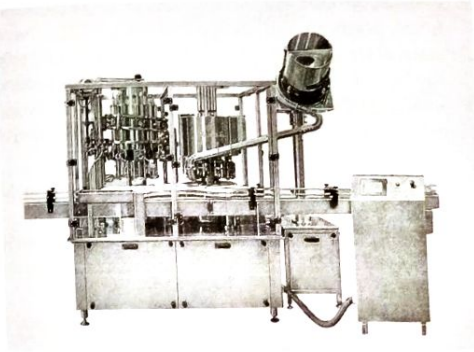
Drawbacks:

- **Clogging**: Sticky materials or small particles can cause fine meshes to clog readily.
- **Cost**: Premium meshes and sieves can be pricey.
- **Durability**: Needs to be handled carefully to prevent breaking fragile meshes.
- **Maintenance**: To preserve accuracy, routine cleaning and inspection are required.

Applications:

- **Pharmaceuticals**: Powder and granule quality monitoring for tablet production.
- **Food Industry**: To ensure quality, separate flour, sugar, and food powders.
- **Mining and Aggregates**: For grading reasons, screening minerals and aggregates is done.
- **Environmental Sciences**: Soil and sediment sample particle size analysis.
- **Chemical Sector**: Separation and filtering

Liquid Filling Machine



Definition

A liquid filling machine is an essential tools in several industries that exactly and efficiently fill containers with liquids, ensuring consistency and reducing waste.

Principle

Liquid filling procedures operate using volumetric or gravimetric filling methods, with volumetric machines pouring predetermined amounts into containers and gravimetric devices weighing liquids for exact filling accuracy.

Liquid Filling Machine Types

1. Piston Filling Machine
2. Peristaltic Filling Machine
3. Gravity Filling Machine
4. Pressure Overflow Filling Machine
5. Temporary Pressure Filling Device

Working Procedure

1. **Container Placement**:
   - Place containers on the conveyor or rotating table of the machine beneath the filling nozzles.
2. **Filling Setup**: Assign filling volume and speed settings based on product and container requirements.
3. **Filling Process**: Turn on the machine, which starts the filling process according to the filling technique (gravimetric or volumetric) that has been chosen.
   - Filling nozzles or tubes are used to dispense liquid into containers until the required volume is attained.
4. **If necessary, levelling and capping**:
   - Some machines include extra stations for capping filled containers or levelling the liquid level.
5. **Monitoring and Adjustment**: Keep an eye on the filling procedure to guarantee correctness, and make any necessary adjustments to the parameters for various goods or container sizes.
6. **Maintenance and Cleaning**: To avoid cross-contamination between batches, properly clean the machine after each usage:
   - Conduct routine maintenance to guarantee that electronic controls, valves, and pumps are operating properly.

Benefits:

- **Precision**: Accurately fills amounts in accordance with product requirements.
- **Efficiency**: Compared to manual filling, it lowers labour costs and speeds up production.
- **Versatility**: Able to handle a broad spectrum of container sizes and liquid viscosities.
- **Minimised Waste**: During filling processes, less product is lost and spilled.

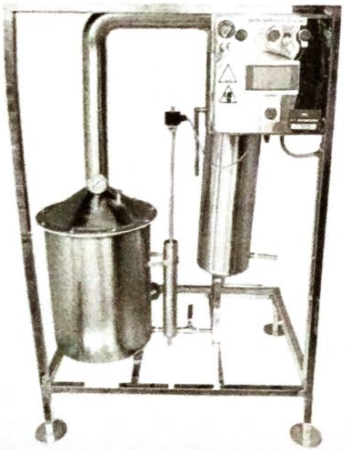
Drawbacks:

- **Complexity**: Requires maintenance, calibration, and setup by expert personnel.
- **Initial Cost**: More expensive than filling techniques that are manual or semi-automated.
- **Cleaning Time**: It might take a while to clean in between changing products.
- **Product Compatibility**: Specialised tools or modifications may be needed for specific liquids or containers.

Applications:

- **Pharmaceutical Industry**: Injectable solutions, oral liquids, and filling syrups are manufactured.
- **Cosmetics Industry**: Packaging lotions, serums, and skincare items during the manufacturing process.
- **Food and Beverage Sector**: Canning sauces, oils, drinks, and condiments in liquid form.
- **Chemical Industry**: Filling lubricants, detergents, and other industrial liquids.

Distillation Plant



Definition

A distillation plant is an industrial facility with a variety of systems and equipment intended to carry out large-scale distillation operations. Condensers, heat exchangers, distillation columns, and other auxiliary equipment needed for heating, vaporising, condensation, and separating liquid mixes are usually included.

Principle

Distillation works on the basis of heating a liquid combination to produce vapour, which is subsequently cooled and condenses back into liquid form. Because the mixture's constituent parts have varying boiling points, they can vaporise and condense at particular temperatures. To concentrate or purify certain components, this separation method takes use of variations in boiling points.

Utility

Production of ethanol, purified water, and other industrial solvents depends on distillation plants:

- The purification and separation of fuels, chemicals, and essential oils.
- Recovering components or precious solvents from waste streams.
- Distillation of spirits and alcoholic drinks.

Parts and Functioning:

- **Distillation Columns**: The process of separation takes place in tall vertical towers. They have several trays or packing materials within to help the liquid and vapour phases come into contact.
- **Heat exchangers**: To save energy and increase efficiency, transfer heat between the heated vapour and the incoming liquid feed.
- **Condensers**: Use air or water to cool vapour to turn it back into liquid.
- **Reboilers**: To keep vaporisation going, heat should be applied to the bottom of the distillation column.

Benefits:

- Generates very pure goods appropriate for a range of uses.
- Able to handle a broad variety of liquid components and combinations.
- Depending on production requirements, it may be scaled up or down.
- Extracts useful elements from leftovers or byproducts.

Drawbacks:

- Needs a lot of energy to run the heating and cooling systems.

- Skill and upkeep are needed for the design and operation of distillation plants.
- Both the initial outlay and ongoing expenses may be substantial.
- Produces waste streams and emissions that require appropriate handling.

Applications:

- Solvent and chemical separation and purification.
- Separating different fractions from crude oil, such as diesel and petrol.
- Manufacturing solvents of pharmaceutical grade and purified water.
- Manufacturing of flavor extracts, essential oils, and distilled spirits.

Strip Packing Machine

Definition

A strip packing machine is a specialist packaging equipment used in the food and pharmaceutical industries that creates and seals individual strips of wrapping material around small products such as chocolates, chewing gum, tablets, and capsules. By producing single-dose units, these devices guarantee consumer convenience, product safety, and cleanliness.

Principle

Continuous packaging is the foundation upon which strip packing machines function. A continuous strip of packing material (usually aluminium or PVC foil) is formed into pockets or cavities, which are then filled with items, sealed, and divided into individual units. Each dose's integrity and tamper-evident character are guaranteed by the sealing procedure.

Use:

- Strip packing equipment facilitates the unit dose packaging of pharmaceutical tablets, capsules, and lozenges intended for retail distribution.
- Packaging candies, gum, and other sweets so that the consumer may easily get them.
- Offering barrier defence against light, moisture, and contamination to preserve the integrity of the product.
- Ensuring convenience of dispensing and precise dosing in retail and healthcare environments.

Strip Packing machine Types

1. One strip at a time processing is done using a single track strip packing machine.
2. **Double Track Strip Packing Machine**: For higher throughput, two strips are processed simultaneously.
3. **Rotary Strip Packing Machine**: This machine continuously seals strips by using rotary sealing drums.
4. **Automatic Strip Packing Machine**: Completely automated for accuracy and rapid output.

Working Procedure:

1. **Feeding and Forming**: Packing material (PVC or aluminium foil) is fed into the machine from a roll:
   - Creating voids or pockets in the substance to contain discrete product dosages.
2. **Filling**: Putting goods (such as pills, capsules, and sweets) into the holes that the packaging material has created.
3. **Sealing**: Using pressure or heat sealing techniques, seal the voids to enclose the items.
   - Making sure the sealed strip is divided into discrete unit dosages, or packets, in preparation for distribution.
4. **Coding and Inspection**: You can choose to code each packet with product details, batch numbers, or expiration dates:
   - Checking for quality control to guarantee correct sealing and integrity of the product.

5. **Packing and Discharge**: Arranging the sealed strips in a stack or collection for subsequent packing (such as cartoning) or direct delivery.

Benefits:

- **Unit Dose Packaging**: Makes it simple to dispense and consume individual dosages.
- **Hygiene and Protection**: guarantees the security of the product and guards against contamination.
- **Automation**: Lowers labour costs and improves manufacturing efficiency.
- **Tamper Evidence**: Seals increase customer trust and product security since they are tamper-evident.

Drawbacks:

- Limited to utilising particular types of packaging materials (e.g., PVC, aluminium foil) due to material constraints.
- More money out of the gate than with manual or easier packing techniques.
- Necessitates routine feeding system and sealing mechanism maintenance.
- Depending on the suitability of the product and the material, certain machines may have speed restrictions.

Applications:

- Packaging for chewing gum, candy, and confections.
- Cosmetic Industry: Single-use cosmetic product and sample packaging.
- Unit-dose packets of vitamins and drugs are dispensed at healthcare facilities.

Pouch Filling Machine

Definition

Pouching machines are professional packing machines used for filling and sealing flexible pouches containing liquids, powders, granules, and solids. By mechanizing the packing process, these machines offer well-organized, hygienic, and appealingly attractive pouch sealing for retail distribution.

Principle

The form-fill-seal (FFS) process is the foundation of pouch filling machines. They create pouches by unfolding a flexible packaging material roll, which is frequently composed of plastic films

or laminates, filling them with the essential items, and sealing them to generate a completed package.

Use:

- Fillings for snacks, cereals, and powdered foods.
- Packaging non-food items including detergents, cosmetics, and medications; - Providing reasonably priced, useful, and lightweight packaging choices.

Pouch Filling Machine Types

1. Vertical Form-Fill-Seal (VFFS) machine.
2. Horizontal Form-Fill-Seal (HFFS) Machine
3. Pre-created Pouch Filling Machine
4. Rotary Pouch Filling Machine
5. Stick Pack Machine

Working Process:

1. **Material Feed**: The equipment is supplied with rolls of flexible packaging material (film).
2. **Pouch Forming**: The machine forms rolls of packing material into pouches by using moulds or forming collars.
3. **Product Filling**: To fill the pouches with the necessary product, volumetric or gravimetric filling machines are utilised.
4. **Sealing**: The filled pouches can be sealed using heat, ultrasonic, or other appropriate sealing processes, depending on the material.

5. **Cutting and Discharging**: The sealed pouches are taken off the roll and taken out of the machine so they may be packed or processed further.
6. **Coding and Inspection**: Pouch codes containing product information, expiration dates, or batch numbers are optional:
   - Conducted quality control inspections to guarantee product integrity and appropriate sealing.

Benefits:

- **Efficiency**: Automation of the packing process boosts productivity and lowers labour expenses.
- **Versatility**: Supports a large variety of goods and pouch diameters.
- **Hygiene**: Sealed packaging guarantees product freshness and safety.
- **Sustainability**: Compared to rigid containers, this type of packaging uses less wasteful lightweight materials.

Drawbacks:

- More expensive than with manual or less mechanised packing techniques.
- Feeding systems and sealing mechanisms must be maintained on a regular basis.
- Restricted to package materials that are heat- or ultrasonic-sealing compatible.
- Certain machines might not be able to process pouch sizes that are extremely tiny or huge.

Applications:

- The beverage industry is responsible for packaging various products such as snacks, sauces, condiments, and ready-to-eat meals, including liquid concentrates, energy drinks, and juices.
- Powder, pill, and capsule packaging.
- Lotion, cream, and gel packaging.
- Packaging agricultural products, chemicals, and detergents.

Pyrometer

Definition

A pyrometer measures an aim's surface temperature by identifying and quantifying the thermal radiation it radiates without direct contact.

Principle

Pyrometers perceive infrared radiation from heated objects, using the Stefan-Boltzmann law to convert it into an electrical signal and calibrate it to show the temperature.

Use

Pyrometers are necessary in many different sectors for the following: Industrial Processes: Keeping an eye on the temperatures in boilers, kilns, and furnaces:

- Ascertaining the melting point of alloys and metals.
- Tracking the temperatures at which glass melts and forms.
- Monitoring engines and checking exhaust temps.
- Medical: Using non-contact thermometers to take a patient's temperature.

Various Pyrometer Types

1. Optical Pyrometer.
2. Infrared Pyrometer
3. Fixed Point Pyrometer

Working Procedure

In pyrometers, infrared radiation is concentrated onto a detector using a lens or other optical device:

- The detector translates the infrared light into an electrical signal.
- After the signal is processed, a screen displays the object's temperature in real time.

Benefits:

- **Non-contact Measurement**: This method permits taking a temperature reading without harming the subject.

- **Broad Temperature Range**: Accurately measures temperatures that are extremely high.
- **Quick Response**: Gives temperature readings right away.
- **Versatility**: Fit for a range of research and industrial uses.

Drawbacks:

- **Accuracy Dependent on Emissivity**: The object's emissivity and surface polish may have an impact on accuracy:
- **Environmental Interference**: Particles such as smoke, dust, or other debris might skew measurements.
- **Cost**: Initially more expensive than contact thermometers.
- **Complexity**: To obtain correct readings, calibration and knowledge of emissivity changes are required.

Applications:

- **Steel and Metal Industry**: Casting processes and furnace temperature monitoring and control.
- Monitoring temperatures during the melting and shaping operations in the production of ceramics and glass.
- **Electronics Manufacturing**: Making sure soldering and reflow procedures are performed with exact temperature control.
- **Medical Sector**: Clinical temperature measurement with non-contact thermometers.
- **Research and Development**: Monitoring temperature during research and experiments in science.

Multiple Choice Questions

1. **What is the main purpose of a Yantra in Ayurvedic pharmaceutical processes?**
   a. To purify water
   b. To control Parada (mercury) and perform complex operations like Svedana (steaming)
   c. To store herbal medicines
   d. To measure the dosage of herbal preparations
2. **According to Rasa Ratna Samuchchaya, how many types of Yantras are mentioned?**
   a. 20 b. 32 c. 41 d. 45
3. **In the preparation of Dolayantra, what is used to hang the medicinal drug into the liquid?**
   a. A metal chain b. A thin rod
   c. A strong and long thread
   d. A silk cloth
4. **Which of the following liquids can be used for Swedana in Dolayantra?**
   a. Godugdha (cow's milk)
   b. Kanji (sour gruel)
   c. Triphala Kvatha (decoction of Triphala)
   d. All of the above
5. **What additional layer is recommended for Svedana of Parada in a Dolayantra?**
   a. Bhojapatra (Betula utilis)
   b. Silk cloth
   c. Cotton wool d. Plastic sheet
6. **What is the primary material used to fill the earthen vessel in a Valuka Yantra?**
   a. Water b. Salt
   c. Sand d. Clay
7. **In a Baluka Yantra, what is the purpose of using a grass stick?**
   a. To stir the contents
   b. To monitor the heat levels
   c. To measure the temperature
   d. To support the glass bottle
8. **What is the purpose of sealing the mouth of the vessel in Valuka Yantra?**
   a. To prevent contamination
   b. To maintain controlled heating
   c. To reduce evaporation
   d. To keep the vessel airtight
9. **Which of the following Yantras is used in the preparation of Kupipakva Rasayanas?**
   a. Dolayantra b. Baluka Yantra
   c. Vata Yantra d. Putaka Yantra
10. **Which text mentions the highest number of Yantras, according to the provided information?**
    a. Rasa Ratna Samuchchaya
    b. Anandakanda
    c. Parada Samhita d. Rasa Jala Nidhi

11. **What is the primary use of Puta Yantra?**
    a. Grinding substances
    b. Heating and processing of Parada (mercury)
    c. Extracting oils from herbs
    d. Mixing medicinal substances
12. **Which material is recommended for the construction of the Khalva Yantra?**
    a. Iron b. Clay
    c. Stone d. Wood
13. **What is the primary function of the Urdhva Patana Yantra?**
    a. Sublimation or distillation of mineral substances
    b. Extraction of oils from herbs
    c. Heating of mercury
    d. Grinding medicinal substances
14. **Which Yantra is specifically designed for use over fire and made from iron?**
    a. Vartula Khalva b. Patala Yantra
    c. Tapta Khalva d. Adhahpatana Yantra
15. **The primary purpose of the Darvika Yantra is to:**
    a. Grind medicinal substances
    b. Melt substances like sulfur, lead, and tin
    c. Extract essential oils
    d. Process mercury
16. **Which of the following Yantras is used for extracting oil from herbal drugs?**
    a. Puta Yantra b. Khalva Yantra
    c. Patala Yantra d. Kupi Yantra
17. **What is the key difference in the design of Tiryak Patana Yantra compared to other Patana Yantras?**
    a. It is used for grinding
    b. It has a horizontal distillation setup
    c. It is used over fire
    d. It uses cowdung cakes for heating
18. **The Arkapatana Yantra primarily functions to:**
    a. Heat and process mercury
    b. Extract essential oils from herbs
    c. Grind substances to a fine powder
    d. Distill mineral substances
19. **Which Yantra uses a pit and is involved in oil extraction?**
    a. Patala Yantra
    b. Tiryak patana Yantra
    c. Adhahpatana Yantra
    d. Urdhva Patana Yantra
20. **The Kupi Yantra is traditionally used in Rasa Shastra for:**
    a. Grinding medicinal herbs
    b. Oil extraction
    c. Heating and processing mercury
    d. Distillation and sublimation processes
21. **Which Yantra is specifically designed for the Marana process, used in the incineration of metals like gold, silver, and copper?**
    a. Sharava Yantra b. Pithara Yantra
    c. Vidyadhara Yantra d. Sthali Yantra
22. **What is the primary purpose of the Sharava Yantra in Ayurvedic medicine preparation?**
    a. To purify metals
    b. To convert metals into Bhasma
    c. To ensure uniform heating and prevent volatile loss
    d. To extract medicinal substances
23. **Which Yantra is described as consisting of two vessels joined together and used in the practice of Rasatantra?**
    a. Pithara Yantra b. Vidyadhara Yantra
    c. Palika Yantra d. Svedana Yantra
24. **The Sthali Yantra is used for heating a mixture of minerals and medicinal drugs. Which material is specifically mentioned as being combined in this process?**
    a. Iron b. Copper
    c. Gold d. Silver
25. **Which of the following Yantras involves placing a mineral substance on top of a secured cloth covering a vessel containing water?**
    a. Vidyadhara Yantra b. Svedana Yantra
    c. Sharava Yantra d. Palika Yantra
26. **Which principle primarily drives the operation of a grinder machine?**
    a. Impact and shearing
    b. Abrasive action
    c. High-speed rotors
    d. Compression and friction
27. **Which type of grinder is specifically used for grinding cylindrical surfaces?**
    a. Surface Grinders
    b. Cylindrical Grinders

c. Belt Grinders
d. Bench Grinders

28. What is the primary function of a Disintegrator Machine?
a. To incinerate materials
b. To convert materials into small particles or powders
c. To polish and finish surfaces
d. To sharpen cutting tools

29. Which type of Disintegrator Machine uses high-velocity air streams to crush materials into fine powders?
a. Hammer Mills b. Pin Mills
c. Jet Mills d. Ball Mills

30. What is the main application of a Pulverizer Machine in the mining and metallurgy industries?
a. Preparing animal feed
b. Crushing minerals and ores for extraction
c. Enhancing food items' consistency
d. Recycling waste materials

31. Which machine is particularly noted for producing fine, consistent particle sizes?
a. Grinder Machine
b. Disintegrator Machine
c. Pulverizer Machine d. Bench Grinder

32. Which process involves fastening the workpiece to a holding apparatus or machine table in a Grinder Machine?
a. Dressing the grinding wheel
b. Grinding operation
c. Assembling the workpiece
d. Product collection

33. One of the drawbacks of using Disintegrator Machines is:
a. High upfront and recurring expenses
b. High energy consumption
c. Material restriction
d. Needs skilled operators

34. In the Pulverizer Machine, which type of mill uses rotating cylinders filled with grinding media to reduce material size?
a. Jet Mills b. Ball Mills
c. Roller Mills d. Impact Pulverizers

35. Which of the following is a shared application of Grinder, Disintegrator, and Pulverizer machines?
a. Manufacturing metal components
b. Recycling metals and plastics
c. Sharpening cutting tools
d. Preparing animal feed

36. Which of the following types of powder mixers uses a V-shaped chamber for mixing?
a. Ribbon Blenders b. Tumbling Mixers
c. V-Blenders
d. Conical Screw Mixers

37. What is the main principle behind the operation of a Mechanical Shifter Machine?
a. Mechanical Compression
b. Particle Size Separation
c. Agglomeration
d. Fluidization

38. Which type of ball mill uses planetary-like movement for grinding materials?
a. Horizontal Ball Mills
b. Vibrating Ball Mills
c. High-Energy Ball Mills
d. Planetary Ball Mills

39. Which of the following machines is used for transforming bulk materials into uniformly sized grains or pellets?
a. Ball Mill b. Granulator Machine
c. Dryer d. Mechanical Shifter

40. In which type of dryer are materials dried using low pressure to speed up the drying process?
a. Rotary Dryer b. Spray Dryer
c. Vacuum Dryer d. Freeze Dryer

41. What is the primary use of a Fluidized Bed Dryer?
a. To freeze and dry materials by sublimation
b. To use fluidized air for drying solid particles
c. To atomize liquids into fine droplets
d. To tumble and dry materials in a revolving drum

42. Which type of granulator uses high-speed mixing blades to combine and granulate materials?
a. Rotary Drum Granulator
b. Oscillating Granulator
c. High-Shear Granulator
d. Extrusion Granulator

43. Which of the following is NOT an advantage of using a powder mixer machine?**
a. Uniform Mixing
b. Versatility
c. High Energy Consumption
d. Scalability

44. Which machine is primarily used to create fine powders by grinding and pulverizing materials?
a. Granulator Machine
b. Mechanical Shifter Machine
c. Ball Mill d. Dryer

45. What is the key benefit of using a dryer in material processing?
a. Increases moisture content
b. Enhances material flowability
c. Decreases product stability
d. Reduces shipping costs by lowering weight

46. What is the main principle of a Tablet Compressing Machine?
a. Heating b. Compression
c. Cooling d. Evaporation

47. Which type of Tablet Press is designed for producing large quantities at higher speeds?
a. Single Station Tablet Press
b. Mini Tablet Press
c. High-Speed Tablet Press
d. Bilateral Tablet Press

48. Which of the following is NOT a disadvantage of a Tablet Compressing Machine?
a. Requires significant initial investment
b. Needs frequent maintenance
c. Generates inconsistent dosage and tablet size
d. Takes time to clean between batches

49. What is the primary function of a Coating Pan Machine in the pharmaceutical industry?
a. Grinding tablets into powder
b. Compressing granules into tablets
c. Applying a coating material to tablets
d. Mixing pharmaceutical ingredients

50. Which type of Coating Pan Machine is designed to facilitate effective coating and drying through perforations?
a. Non-Perforated Coating Pan
b. Perforated Coating Pan
c. Fluidized Bed Coating Machine
d. Accela-Cota Coating Machine

51. What is the primary use of a Polishing Pan Machine?
a. Compressing powders into tablets
b. Coating tablets with a protective layer
c. Polishing tablets to enhance their appearance
d. Mixing pharmaceutical ingredients

52. Which type of Polishing Pan Machine uses vibratory motion to polish smaller, more delicate items?
a. Rotary Polishing Pan
b. High-Speed Polishing Pan
c. Vibratory Polishing Pan
d. Fluidized Polishing Pan

53. What principle does the End Runner Machine operate on?
a. Compression
b. Shear and impact milling
c. Evaporation d. Centrifugation

54. Which type of End Runner Mill uses two heavy rollers that rotate in opposite directions?
a. Single End Runner Mill
b. Double End Runner Mill
c. High-Speed End Runner Mill
d. Mini End Runner Mill

55. In which industry is the Edge Runner Machine commonly used to prepare materials for the creation of ceramics?
a. Pharmaceutical Industry
b. Cosmetics Industry
c. Mining Industry
d. Ceramics and Pottery

56. What is the primary principle behind capsule filling machines?
a. Dosing and encapsulation
b. Heating and cooling
c. Agitation and mixing
d. Sealing and cutting

57. Which of the following is a benefit of using a capsule filling machine?
a. Increased manual labor
b. Reduced dosing accuracy
c. Flexibility in filler materials and capsule sizes
d. Higher maintenance costs

58. Which type of capsule filling machine requires the least human intervention?
a. Manual Capsule Filling Machine
b. Semi-Automatic Capsule Filling Machine
c. Fully Automated Capsule Filling Machine
d. Capsule Filling Machines by Capsule Size

59. Ointment mixer machines operate primarily by:
a. Volumetric filling b. Piston filling
c. Mechanical agitation and mixing
d. Sealing and coding

60. Which of the following is NOT a drawback of an ointment mixer machine?
a. Requires knowledgeable personnel for maintenance
b. High initial cost compared to hand mixing
c. Limited to specific types of ointments
d. Takes up floor space in manufacturing facilities

61. What is the main application of an ointment mixer machine?
a. Filling capsules
b. Producing topical creams and ointments
c. Packaging liquids
d. Distilling solvents

62. The principle of a tube filling machine is based on:
a. Piston filling
b. Volumetric or piston filling
c. Mechanical mixing
d. Heating and cooling

63. Which of the following is an advantage of using a tube filling machine?
a. Higher labor costs
b. Slow production speed
c. Hygienic and contamination-free packaging
d. Limited tube diameter compatibility

64. Which type of tube filling machine is designed for high throughput?
a. Manual Tube Filling Machine
b. Semi-Automatic Tube Filling Machine
c. Rotary Tube Filling Machine
d. Hot Air Tube Sealing Machine

65. Sieves and meshes are primarily used for:
a. Heating and cooling
b. Particle size separation
c. Volumetric filling
d. Agitation and mixing

66. What is a key benefit of using sieves and meshes?
a. Increases clogging
b. Requires less maintenance
c. Offers accurate particle size analysis
d. Limited to specific particle sizes

67. Which type of sieve is used for precise particle size analysis in laboratories?
a. Woven Wire Mesh b. Perforated Plate
c. Electroformed Sheet
d. Laboratory Test Sieves

68. Liquid filling machines operate using which primary method?
a. Mechanical mixing
b. Volumetric or gravimetric filling
c. Heating and cooling
d. Particle size separation

69. Which of the following is a drawback of liquid filling machines?
a. Low initial cost
b. Requires minimal maintenance
c. Cleaning time between product changes
d. Limited to solid products

70. Which industry is NOT commonly associated with liquid filling machines?
a. Pharmaceutical Industry
b. Food and Beverage Sector
c. Mining and Aggregates
d. Cosmetics Industry

71. A distillation plant primarily operates on the principle of:
a. Volumetric filling
b. Particle size separation
c. Heating a liquid mixture to produce vapor
d. Mechanical agitation and mixing

72. Which of the following is an application of a distillation plant?
a. Sieving particles b. Mixing ointments
c. Purifying water d. Filling capsules

73. What major drawback of distillation plants?
a. Low energy consumption
b. Simple design and operation
c. High energy requirements
d. Limited scalability

74. Strip packing machines are primarily used for:
a. Mixing ointments
b. Filling capsules
c. Unit dose packaging of small products
d. Distilling solvents

75. Which of the following is NOT a benefit of strip packing machines?
a. Tamper-evident seals
b. Low initial cost
c. Automated packaging process
d. Hygiene and protection

76. What type of strip packing machine is designed for high-speed production?
a. Single Track Strip Packing Machine
b. Double Track Strip Packing Machine
c. Rotary Strip Packing Machine
d. Manual Strip Packing Machine

77. The working principle of a pouch filling machine is based on:
a. Form-fill-seal (FFS) process
b. Volumetric filling
c. Mechanical mixing
d. Particle size separation

78. Which of the following is a drawback of using a pouch filling machine?
a. High versatility
b. Easy maintenance
c. Restricted to specific sealing-compatible materials
d. Quick product changeover

79. Which type of pouch filling machine is used for filling pre-made pouches?
a. Vertical Form-Fill-Seal (VFFS) Machine
b. Horizontal Form-Fill-Seal (HFFS) Machine
c. Pre-created Pouch Filling Machine
d. Rotary Pouch Filling Machine

80. What does a pyrometer measure?
a. Pressure b. Temperature
c. Particle size d. Viscosity

81. Pyrometers operate based on which principle?
a. Mechanical agitation
b. Infrared radiation detection
c. Volumetric filling
d. Particle size separation n.

82. Which type of pyrometer is used to measure surface temperature without direct contact?
a. Optical Pyrometer
b. Pressure Pyrometer
c. Viscosity Pyrometer
d. Volumetric Pyrometer

Answer Sheet

1.	B.	2.	B.	3.	C.	4.	D.	5.	A.	6.	C.	7.	B.	8.	B.
9.	B.	10.	C.	11.	B.	12.	C.	13.	A.	14.	C.	15.	B.	16.	C.
17.	B.	18.	B.	19.	A.	20.	D.	21.	B.	22.	C.	23.	B.	24.	B.
25.	B.	26.	B.	27.	B.	28.	B.	29.	C.	30.	B.	31.	C.	32.	C.
33.	B.	34.	A.	35.	D.	36.	C.	37.	B.	38.	D.	39.	B.	40.	C.
41.	B.	42.	C.	43.	C.	44.	C.	45.	D.	46.	B.	47.	C.	48.	C.
49.	C.	50.	B.	51.	C.	52.	C.	53.	B.	54.	B.	55.	D.	56.	A.
57.	C.	58.	C.	59.	C.	60.	C.	61.	B.	62.	B.	63.	C.	64.	C.
65.	B.	66.	C.	67.	D.	68	B.	69.	C.	70.	C.	71.	C.	72.	C.
73.	C.	74.	C.	75.	B.	76.	C.	77.	A.	78.	C.	79.	C.	80.	B.
81.	B.	82.	A.												

Short Question Answer

1. Write on Dola Yantra.
2. Pyrometer.
3. Write the working principle of Edge Runner and End Runner?
4. Write the application of Disintegration machine?
5. Advantage and disadvantages of Liquid Filling machine?

Long Question Answer

1. Define Yantra, its nirukti, Number of Yantras according to different scholars and explain the Patana Yantra in detail?

• • •

5 Yantraopakaranani - II

• Lecture: 5 hours, non-lecture: 4 • • Total Marks- 5 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Puta (पुट)

Introduction

The concept of 'Puta' in Rasa literature is described as an ancient heating method used for producing various Bhasma (calcined powders) from metals and minerals. During the Samhita period, terms like 'Puteshvara' and 'Bhasma' were not directly mentioned, but words such as Churna (fine powders) of metals and minerals were used. The concept of Puta emerged during the period of Nagarjuna, marking the beginning of references to both Puta and Marana methods in pharmaceutical texts for metals and minerals.

Evolution in Puta

The detailed aspects of Puta were elaborated by Acharya Yashodhara Bhatt in Rasa Prakasha Sudhakara and later by Vagbhattacharya with slight variations. Vagbhattacharya defines 'Puta' as the nature and quantum of heat necessary for the Paka (conversion) of a substance into a form that can be absorbed by the organism. Thus, Putapaka plays a central role in the Marana process, converting metals and minerals into Bhasma by disintegrating their particles from a coarse to a fine state through the application of heat from various sources.

Practical Considerations in Puta Application

Rasa texts do not specify the weight and size of cow dung cakes to be used in Puta, nor do they explicitly mention the relationship between the quantity of metal (batch size) and the number of cow dung cakes required. However, in Vaidyaka Paribhasha Pradipa, the term 'Sharava' is explained as equivalent to 8 Pala, or approximately 320 grams. This suggests that around 320 grams of metal might be used per Puta application.

Deciding the Type of Puta

According to Rasa Ratna Samuchchaya, when no specific indication is given regarding the type of Puta to be used, it can vary based on the strength (bala) or weakness (abala) of the substance being processed. This implies that the type of Puta should be determined by studying the characteristics of the metal. Classical references sometimes mention the number of Puta required for Marana, but in practice, the indicated number may not always be sufficient to prepare a compatible Bhasma. In some cases, fewer Puta are adequate. Therefore, the type of Puta should be generally considered, but its application should be adjusted based on the metal's characteristics and the outcome of each Puta.

Heat Distribution and Practical Implications

The distribution of heat varies depending on whether one Sharava Samputa (vessel) or more than two are placed in a single pit. Ideally, one Sharava Samputa should be used in a single pit to ensure even heat distribution and consistent results in the Bhasma preparation process.

Nirukti

पुट संश्लेषणे तुदादी पुट संसर्गे पुटयाति तुदादी।

(Amarkosha 2/7/138 पृ.सं. 322)

- **पुट (Puta):** Refers to a purification or processing method, often involving heating, cooking, or multiple cycles of preparation to enhance the medicinal potency of a substance.
- **संश्लेषणे (Samshleshane):** In this context, it might refer to the process of combining or synthesizing various medicinal ingredients.
- **तुदादी (Tudadi):** Likely refers to a category of herbs or therapeutic actions, potentially those associated with relieving pain or other specific symptoms.
- **संसर्गे (Samsarge):** Indicates the interaction or combination of different substances, essential in creating effective formulations.
- **पुटयाति (Putayati):** Suggests the act of processing or refining a substance through repeated cycles of preparation, crucial for ensuring its efficacy in treatment.

The verse seems to describe a methodical process where different medicinal substances are combined (potentially from the Tudadi group) and subjected to repeat processing (Puta). This combination and purification process is likely aimed at enhancing the therapeutic effectiveness of the final preparation, particularly for treatments involving pain or related conditions.

Definition

धातुषूपलेन्धनदाहः पुटम्। (R.Kam.U. 2/25)

Incineration of metals in heat of Upala is known as Puta.

रसादि द्रव्य पाकानां प्रमाणज्ञापनं पुटम्।
नेष्टो न्यूनाधिकः पाकः सुपाकं हितमौषधम्।। (R.R.S. 10/47)

Puta refers to the amount of heat required for the incineration of Rasa and medicines. This particular amount of heat ensures that the process is neither too low nor too high. The metals and minerals are burnt in the required heat, making them absorbable and assimilative by the body, which makes them beneficial as medicine.

रसोपरसलोहादेः पाकमानप्रमापकम्।
उत्पलाद्यग्निसंयोगात् यत्तदत्र पुटं स्मृतम्।। (R.T. 3/32)

The term "Puta" is defined differently across various texts. In Rasa Ratna Samuchchaya, the emphasis is on the amount of heat, while in Rasatarangini, the focus is on the types of fuels required, such as Upala and Tusha, used to subject substances like Rasa, Uparasa, and Lauha to heating.

Importance

1. To ensure the material is heated to the right temperature, not too much or too little.
2. To reduce the size of particles in the material.
3. To create the right conditions for beneficial chemical reactions to happen.
4. To make the material more flexible, smooth, and uniform.
5. To prepare the material for use in healing and therapeutic applications.
6. To transform the material into a form that is easily absorbed and used by the body.
7. Putas enhance the bhasmas with properties like eliminating impurities, increasing effectiveness, making it resistant to reformation, improving digestion, and more.

General Method of Preparation

भस्मार्थं शोधितं द्रव्यं गृह्णीयात् यादृविभिषवः।
प्रायो द्रवेषु सर्वेषु नित्यं भावना विधिः।।
द्रव्यस्यैकस्य कर्तव्या विधिना मर्दनः सह।
तत्कालेन गुटिकाः सर्वा कार्याश्च द्वित्तितोलिकाः।।
सुशुष्कञ्चापते तीव्र स्थाप्यं भस्म समूहकम्।
छिद्रता रहिते पात्रे सप्त कर्पटिका कृते।।
पात्रस्थञ्च पुटे पाक्यं पुटे शीतं समुद्धरेत्।।

(Rasen.Parpatak 1/24-26)

1. The purified materials were levigated with the required liquid medium for 3 days.
2. The drugs are made into 2 tolas (24 gms) of pellets.
3. The pellets are completely dried.
4. A clay saucer is used to put the dried pellets.
5. Seven layers of Kapadamitti are placed in the saucer, sealing it.
6. The sealed saucer is incinerated.
7. The material is then left to cool on its own after incineration.
8. It is called once it self-cools down the content.
9. This is repeated a number of instances, as wanted.

Types

1. **Based on Fuel:**

पुटं तञ्चतुर्विधं तुषपुटं, करीषपुटं, उपलपुटं खदिरादिकाष्टपुटंचेति।

(Sha.S.M.Kh. 12/4-12)

1. Tusha Puta
2. Karisha Puta
3. Upala Puta
4. Khadira Puta

2. Based on Source of Heat:

1. Surya Puta
2. Chandra Puta
3. Agni Puta
   - **a. Direct**
     - **Mridu Agni-** Kapota Puta, Lavaka Puta.
     - **Madhyam Agni-** Varaha Puta, Kukkuta Puta
     - **Tivra Agni-** Gaja Puta, Maha Puta
   - **b. Indirect**
     - Baluka Puta
     - Lavana Puta
     - Gorvara Puta

3. Based on Size:

- Kapota Puta
- Lavaka Puta
- Varaha Puta
- Kukkuta Puta
- Gaja Puta
- Maha Puta

4. Based on Apparatus: e.g.- Bhanda Puta

1. Chandra Puta (चन्द्रपुट)

Chandra Puta is described by Acharya Yadavaji Trikamaji. Chandraputa, unlike the above-mentioned method, was not as widely referred to in classical Rasa texts and works on an entirely different principle, working mainly by cooling of nutrients rather than heating.

Working Principle

The drug is levigated with a specific liquid medium and then exposed to moon rays (for example, Chandraputa). The logic behind using this method is that it uses the cooling properties, i.e., Shita, derived from the moonlight. This includes the following principal elements:

1. **Cooling Effect (Shita Guna)**: Drug exposure to moon rays imparts the cooling effect from it enhances its natural quality of being cold. This may be particularly useful in formulas cooling to the body or which are Pitta reducing.
2. **Produces minimal heat**: It doesn't directly apply any form of heat while in process, but instead generates a little amount of heat from trituration (grinding/levigation) the drug with the liquid medium. This gentle warmth does not mask the cooling sensation but may help nudge the substance into deeper transformation.
3. **No Paka Karma**: Chandraputa is unique in the sense that, unlike Agniputa or any other traditional methods employing a Paka karma (cooking/carbonizing by way of fire), there are no high temperatures involved directly by fire. Rather, it utilizes the moon as a cooling medium in its milder and natural state, dissimilar to other Ayurvedic preparation techniques.

Quantum of Heat

The amount of heat here is negligible, not regulated, and this doesn't mainly give any heat. Prior focus is given to when the drug has been exposed under moonlight as it provides a cool (sheeta) effect known as Shita Guna. As the process is aimed at cooling and heat minimization, the quantum of heat generated would be so low it will not even fall into any categories or be quantified under traditional Ayurvedic texts. It does not create heat but instead works on reshaping and amplifying the cooling features of a drug.

Applications:

- Pravala Pishti
- Pravala Bhasma

The Chandraputa method works to enhance the two applications cooling properties needed for conditions with a "cold" or calming effect. Utilizing the Chandraputa method, healing remedies can be formulated to support Pitta conditions or excess heat-related health challenges that benefit from being cooled by moonlit solutions.

2. Surya Puta (सूर्यपुट)

द्रव्याणां भावितानान्तु भावनौषधजै रसैः।
शोषणं सूर्यतापे यत्तत्सूर्यपुटमुच्यते।। (R.T. 3/37)

Surya Puta, also known as Raudra Puta or Bhanu Paka, is a process in which the sun serves as the source of heat.

Working Principle of Surya Puta

1. Surya Puta uses the natural heat of the sun as the primary energy source. This technique uses the heat of solar radiation to slowly warm and dry materials while maintaining their therapeutic qualities.

2. Dravyas, which require bhavana, are mixed with substances like Svarasa (Kvatha) or fresh juice. The blend is mixed well to ensure even consumption of the liquid into the solid components.
3. After the mixture is prepared, it spreads in sunlight. The liquid slowly evaporates due to the heat from the sun, concentrating the active principles in the dravyas. This slow-drying method helps maintain the potency and effectiveness of all ingredients.
4. The sun offers a balanced and controlled form of heat, avoiding overheating or burning. This gentle, even heat ensures that ingredients are treated carefully, preserving their integrity.

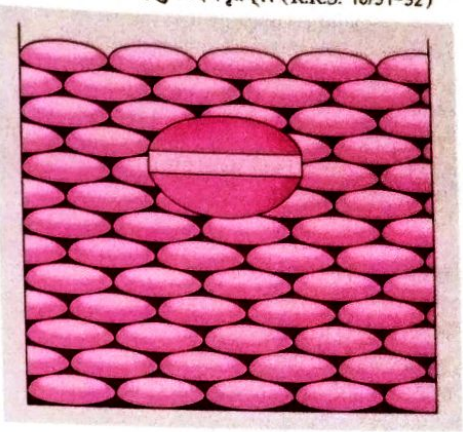
Quantum of Heat

Quantum of heat in Surya Puta implies the amount of naturally generated heat by the sun, which is used for health purposes, especially in the slow heating and drying process of medicaments as mentioned in Ayurvedic practices. The exact amount of heat (in terms of degrees Celsius or Fahrenheit) applied during Surya Puta does not have a standardized measurement, as it is a natural process and varies depending on factors like location, and time of year. The core principle in Surya Puta is that the heat should be mild and evenly spread to enable evaporation of liquids (in Svarasa or Kvatha) without any deterioration due to degradation, alongside rapid removal by means of hot air for effective drying. Very often, it takes several hours or even days depending on the needs of a given formulation. The fact that the exact temperature may be very variable was known to traditional Ayurvedic practitioners who instead relied on their experience and environmental conditions rather than an accurate thermometer – which in many ways is sensible. Instead, the aim is to harness natural solar energy for its specific therapeutic properties without artificial heat sources that might upset the equilibrium and activity of actives.

Application: Surya Puta is especially used for specific formulations, such as Surya paaki Kutaja Taila, where segments of solar energy help potentiate the formulation. It is also applicable in the Bhanupaka (sun processing) of metals like Loha (iron) and the shodhana (purification) of substances like Shilajatu (Shilajija), making them suitable for medicinal use.

3. Maha Puta (महापुट)

निम्ने विस्तरतः कुण्डे द्विहस्ते चतुरस्रके।
वनोत्पलसहस्रेण पूरिते पुटनौषधम्।।
क्रौञ्च्यां रुद्धं प्रयत्नेन पिष्टिकोपरि निक्षिपेत्।
वनोत्पलसहस्रार्धं क्रौञ्चिकोपरि विन्यसेत्।।
वह्निं प्रज्वालयेत्तत्र महापुटमिदं स्मृतम्।। (R.R.S. 10/51-52)



- A square pit should be prepared.
- **Dimensions:** 2 hastas (approximately 91 cm) in depth, length, and breadth.
- A vyama, representing the length between two extended hands, is about 91 cm.
- Total vanopalas required: 1500.
- 1000 vanopalas should be placed in the pit before positioning the musha or samputa.
- The remaining 500 vanopalas are added after placing the musha or samputa.
- The musha or samputa is placed after two-thirds of the pit is filled with vanopalas.
- The remaining vanopalas are then added and ignited.
- After the cow dung cakes have completely burned, the pit is allowed to cool naturally.
- The material inside the samputa is collected after cooling.
- Intense heat is maintained for an extended period.
- The material remains in contact with the fire for a longer duration.

Quantum of Heat

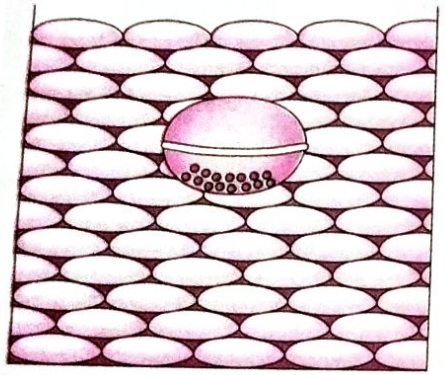
A Maha Puta produces a large amount of heat, as the fires use vanopalas (cow dung cakes) in such great numbers. The dimensions of the pit and number of vanopalas used (1500 in total) result in temperature levels attaining to around 1000°C to 1200°C, which is necessary for processes like bhasta karma, etc., as performed during the incineration procedure as described under Rasa Shastra, wherein complete conversion takes place within musha or samputa materials. The absorbed amount of heat may vary according to the condition and material.

Application

Maha Puta is primarily used for the marana (incineration) of hard substances such as Abhraka (mica) and Vaikranta.

4. Gaja Puta (गजपुट)

राजहस्तप्रमाणेन चतुरस्रं च निम्नकम्।
पूर्णं चोपलसाठीभिः कण्ठावध्यथ विन्यसेत्।।
विन्यसेत् कुमुदीं तत्र पुटनद्रव्यपूरिताम्।
पूर्वाच्छगणतोऽर्धानि गिरिण्डानि विनिक्षिपेत्।।
एतद्गजपुटं प्रोक्तं महागुणविधायकम्।। (R.R.S. 10/53-54)



- A square pit with dimensions of 1 Rajahastha (30 Angulas or 58.5 cm) in length, breadth, and depth is prepared.
- The pit is filled with cow dung cakes up to its neck (2/3 of the pit's height).
- The musha filled with dravyas for marana is placed over the cow dung cakes.
- Half the remaining cow dung cakes are then added to the pit and ignited.
- Rasa Ratna Samuchaya specifies the pit size as 1 Rajahastha (30 Angulas or 58.5 cm).
- 1000 vanopalas are used in Gaja puta.
- Other Acharyas suggest measuring the pit and filling it with vanopalas accordingly.
- After filling 2/3 of the pit with cow dung cakes, the Sharava Samputa is placed inside.
- The remaining 1/3 of the pit is filled with cow dung cakes to cover the Sharava Samputa.
- The pit is then ignited, and after complete burning, it is allowed to cool naturally.
- The next day, the Samputa is removed, and the material inside is collected.

Quantum of Heat

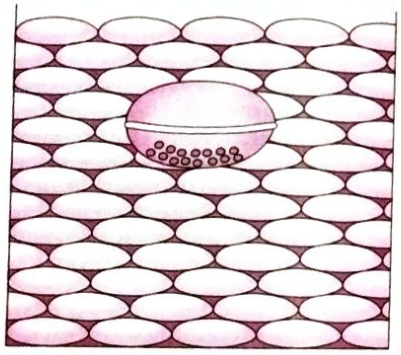
The net amount of heat in Gaja Puta usually varies between 800°C and 1000°C.

Application

Gaja puta is used in the marana (incineration) of hard dravyas such as Abhraka, Tamra, Loha, and others.

5. Varaha Puta (वाराह पुट)

इत्थं चारत्निके कुण्डे पुटं वाराहमुच्यते।। (R.R.S. 10/55)



- A square pit measuring 1 Aratni (22 Angulas or 42.9 cm) in length, breadth, and depth is prepared.
- The pit is filled with cow dung cakes up to its neck (2/3 of the pit's height).

- The Sharava Samputa containing dravya is placed over the cow dung cakes.
- The remaining part of the pit is then filled with cow dung cakes and ignited.
- The pit size as 1 Aratni pramana (22 Angulas or 42.9 cm).
- In the Ayurvedic Formulary of India, the measurement of Varaha Puta is mentioned as 60 cm (length, breadth, and depth).
- Vanopalas are used as fuel in the Varaha Puta.
- No classical texts mention the exact number of Vanopalas.
- Commentators suggest using 500 Vanopalas (350 below and 150 above the Sharava Samputa).
- 2/3 of the pit is filled with cow dung cakes, and then the Sharava Samputa is placed inside.
- The remaining 1/3 of the pit is filled with cow dung cakes to cover the Sharava Samputa.
- The pit is then ignited, and after complete burning, it is allowed to cool naturally.
- After cooling, the material inside the Sharava is collected.

Quantum of Heat

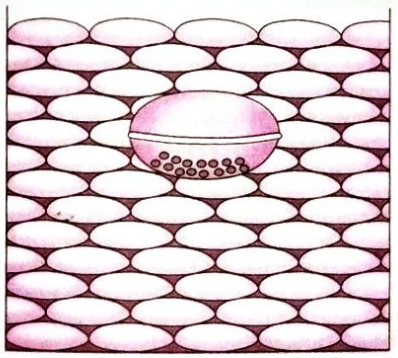
The quantum of heat in Varaha Puta typically reaches around 600°C to 800°C.

Application

Varaha Puta is used in the marana (incineration) of dravyas such as Kaparda, Shukti, and others.

6. Kukkuta Puta (कुक्कुटक पुट)

पुटं भूमितले, तत्तद्वितस्तिद्वितयोच्छ्रयम्।
तावच्च तलविस्तीर्णं तत्स्यात्कुक्कुटकं पुटम्।। (R.R.S.10/56)



- Square pit with a length, breadth, and depth of 2 Vitasti (approximately 24 Angulas or 46.8 cm).
- Vanopalas are used as fuel in the Kukkuta Puta.
- 2/3rd of the pit is filled with vanopalas.
- The Sharava Samputa containing the dravya (substance) is placed over the vanopalas.
- The remaining 1/3rd of the pit is filled with vanopalas over the Sharava Samputa.
- Vanopalas are ignited and allowed to burn completely.
- After cooling (Svangashita), the dravya inside the Samputa is collected.

Quantum of Heat

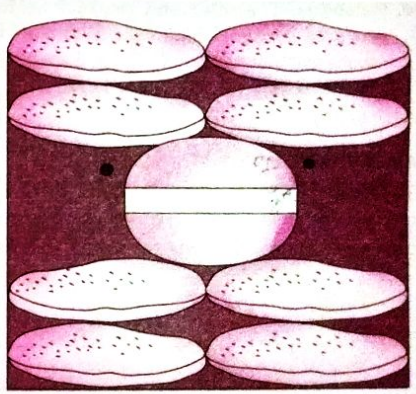
The quantum of heat in Kukkuta Puta typically reaches around 400°C to 600°C.

Application

Kukkuta Puta is used in the marana (incineration) of mridu dravyas (soft substances) like Svarna (gold), Rajata (silver), etc.

7. Kapota Puta (कपोतपुट)

यत्पुटं दीयते भूमावष्टमङ्ख्यैर्वनोत्पलैः।
बद्ध्वा सूताकभस्मार्थं कपोतपुटमुच्यते।। (R.R.S. 10/57)



- Kapota Puta is also referred to as Laghu Puta, Mridu Puta, and Svalpa Puta.
- These terms are used interchangeably to describe the same process.
- Specifically used in the preparation of Parada Bhasma (purified and processed mercury).

- The Puta is created on a flat or plane surface.
- Vanyopalas (types of wood or fuel) are utilized in this process.
- A total of eight Vanyopalas are used to generate the necessary heat for the Puta.
- The eight Vanyopalas are arranged and ignited on the flat surface to create a controlled heating environment.
- The heat generated from these Vanyopalas is used to process the material (such as Parada) placed within the Puta.
- The controlled, mild heating provided by this setup is ideal for delicate substances like mercury, ensuring it is purified and transformed without excessive damage.

Quantum of Heat

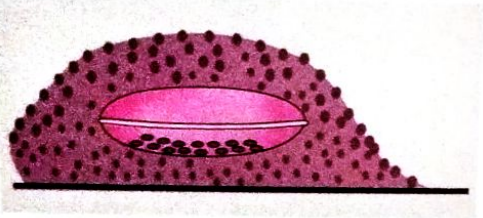
The quantum of heat in Kapota Puta typically reaches around 200°C to 400°C.

Application

1. ***Primary Use***: Kapota Puta is particularly employed in the marana (incineration) and bhasmikarana (conversion to ash) of Parada, a critical step in preparing Parada Bhasma.
2. ***Suitability***: The mild and gradual heating provided by the Kapota Puta is suitable for substances that require careful and controlled processing.

8. Lavaka Puta (लावक पुट)

ऊर्ध्वं षोडशिकामात्रैस्तुषैर्वा गोवरैः पुटम्।
यत्र तल्लावकाख्यं स्यात्सुमृदुद्रव्यसाधने।। (R.R.S. 10/63)



- Lavaka Puta is a specific type of Puta (heating process) used in Ayurveda, where the heat source is created using a specific quantity of Tusha or Govara.
- Tusha (Husk): The outer covering of grains, typically used as a fuel.
- Govara (Cow Dung): Dried cow dung cakes, commonly used as a fuel source in rural.
- The amount of Tusha or Govara used is 1 Shodashika, which is equivalent to one Pala (an ancient unit of weight).
- This precise measurement ensures consistent heating suitable for processing delicate substances.
- The Tusha or Govara is arranged in a manner that provides uniform heat distribution.
- The substance to be processed, known as Dravya, is placed within the Puta setup.
- The heat generated from the burning Tusha or Govara is applied to the Dravya in a controlled manner.
- The Lavaka Puta provides a gentle and consistent level of heat, making it ideal for substances that require careful and precise heating.

Quantum of Heat

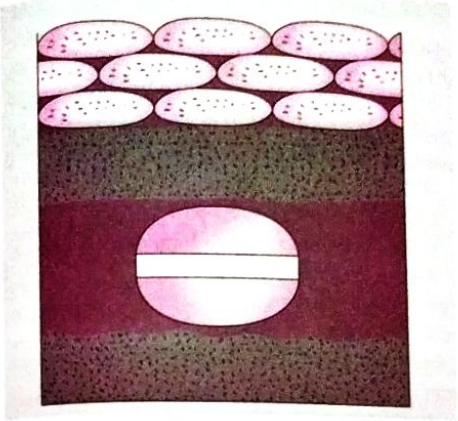
The quantum of heat in Lavaka Puta typically reaches around 100°C to 200°C.

Application

1. **Use for Mridu Dravya**:
   - Lavaka Puta is specifically employed for the marana (incineration) and bhasmikarana (conversion to ash) of Mridu Dravya (soft or delicate substances).
   - This includes materials that are sensitive to high temperatures and require gradual, low-intensity heat for proper processing.
2. **Suitability**:
   - The mild heating environment created by Lavaka Puta is crucial for processing soft substances without causing any damage or unwanted alterations in their properties.
   - This method ensures that the delicate nature of Mridu Dravya is preserved while achieving the desired transformation into a medicinal form, such as Bhasma.

9. Budhar Puta (भूधर पुट)

वह्निमित्रां क्षितौ सम्यङ् निखन्याद् द्वयङ्गुलादधः।
उपरिष्टात्पुटं यत्र पुटं तद्भूधराह्वयम्।। (R.R.S. 10/62)



- The Musha (crucible) is buried underground at a depth of two Angulas.
- Cow dung cakes are used as the fuel source.
- The cow dung cakes are burned directly over the buried Musha to provide the necessary heat.

Application

1. **Primary Use**:
   - This Puta is specifically used for:
   - Preparation of Parada Bhasma (purified and processed mercury).
   - Jarana (a process related to the digestion and assimilation of metals or minerals in Ayurveda).

This method ensures controlled and consistent heating, ideal for the delicate processes involved in the preparation of Parada Bhasma and Jarana.

10. Gorvara Puta (गोर्वर पुट)

गोष्ठ्यान्तर्गोक्षुरक्षुण्णं शुष्कं चूर्णितगोमयम्।
गोबरं तत्समादिष्टं वरिष्ठं रससाधने।।
गोबरैर्वा तुषैर्वापि पुटं यत्र प्रदीयते।
तद्गोबरपुटं प्रोक्तं सिद्धये रसभस्मनः।। (R.R.S. 10/58-59)

- Gorvara refers to cow dung that has been powdered and dried by the hoof of a cow in the cowshed.
- It is considered superior for Rasa Sadhana (metallic processing).
- The Puta, where Gorvara or Tusha (husk) is used as the fuel or heating medium, is termed Gorvara Puta.

- This method is specifically used for the preparation of Rasa Bhasma (medicinal ash of metals).
- The Puta is conducted on a flat surface.

Quantity of Gorvara

R.R.S. - 8 cow dungs.

R.P.S. - 2 Manika (768 gms)

Application

Gorvara Puta is employed in the preparation of Rasa Bhasma, utilizing the properties of Gorvara to achieve effective results in Rasa Sadhana.

11. Baluka Puta (बालुका पुट)

अधस्तादुपरिष्टाच्च क्रौञ्चिकाऽऽच्छाद्यते खलु ।
बालुकाभिः प्रतप्ताभिर्यत्र तद्बालुकापुटम्।। (R.R.S. 10/61)

1. **Using Hot Sand as Fuel**:
   - An earthen pot is used for the process.
   - Half of the pot is filled with hot sand.
   - The Musha (crucible) is placed on the hot sand within the pot.
   - The remaining part of the pot is then filled with additional hot sand.
   - The sand surrounding the Musha provides the necessary heat for the process.
2. **Using External Heating Media**:
   - Instead of relying solely on hot sand, this method uses external heat sources.

- A pot filled with sand and containing the Musha amidst the sand is placed on a stove or another heating device.
- The external heating source is used to heat the sand, which in turn provides the necessary heat to the Musha inside the pot.

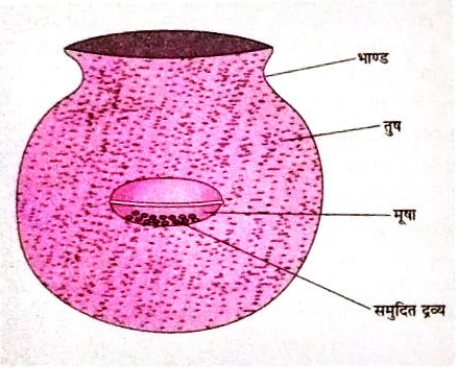
Both methods aim to provide effective and controlled heating for the preparation of substances using the Musha.

Application

1. Baluka Puta is used for the preparation of Lavana (salts) and Kshara (alkalies).
2. Gandhaka Jarana.

12. Kumbha/ Bhanda Puta (भाण्ड पुट)

स्थूलभाण्डे तुषापूर्णे मध्ये मूषासमन्विते।
वह्निना विहिते पाके तद्भाण्डपुटमुच्यते।। (R.R.S.10/60)



- A large earthen pot is used for the process.
- The pot is filled with Tusha (husk) up to the mid-level.
- The Musha (crucible) containing the Putana Dravya (substance to be processed) is placed inside the pot.
- The remaining part of the pot is filled with additional Tusha.
- The Tusha is then ignited to generate heat.
- This heating method is known as Bhanda Puta.

Application

Bhanda Puta is employed in the Marana (incineration) process of substances such as Hafatala and Somala.

Anuktamana (अनुक्तमान)

अनुक्तपुटमाने तु साध्यद्रव्यबलाबलात्।
पुटं विज्ञाय दातव्यमूहापोहविचक्षणैः।।
(R.Chu. 5/162, R.R.S. 10/64)

When the type of Puta for a particular material is not specified:

- It is advised to determine the appropriate Puta by a trial and error approach.
- Utilize personal skill, wisdom, and experience during the process.

एतानि पुटानि यत्र यत्रोपयुक्तानि तत्र तत्र विचार्य देयानि।
प्रथमं पुटं गोवरेणैव।
द्वितीयादि पुटे कुनर्गन्धं दत्त्वा निम्बूरसेन मर्दयित्वा कुक्कुटपुटं दद्यात्।।
एवं यावद्विहितपुट पर्यन्तं कुर्यात्।।
इदं सर्वत्र लोहादि मारणे ज्ञेयम्।
यदि तु तीक्ष्णादि लोहमारणं तदा गजपुटानि ज्ञेयानि तथा ताम्रादिमारणे काष्ठादिजन्योऽग्नि पाको ज्ञेयः।।
(R.Ka.Dha. 1/2/42, Up.P.)

The following general guidelines should be followed when puta is not mentioned:

- The first Puta should be Gorvara Puta.
- The second Puta should be Kukkuta Puta, with the material levigated with lemon juice and mixed with sulphur.
- Continue this pattern, applying subsequent Putas, until the desired results are achieved.
- This approach is generally recommended for the reduction of Loha (iron) and similar materials.

For Specific Materials

- In the case of Tikshna Loha (steel), Gajaputa should be applied.
- For the reduction of Tamra (copper) and similar materials, the reduction should be carried out using firewood as fuel.

Rationality Behind Puta

1. When a substance is thrown upwards, it naturally falls back due to Earth's gravitational pull. This principle demonstrates the inherent heaviness or density of substances.
2. The Puta process reduces the earthly (heavy) qualities of the metal while increasing its ethereal (light) qualities.

3. This transformation allows the substance to resist the force of gravity more effectively, symbolizing its increased lightness and refined nature.
4. The ash produced from the incineration process stays longer in the stomach and other digestive organs.
5. This prolonged presence ensures proper digestion and allows the fine particles of the substance to be maximally absorbed into the bloodstream.
6. The fine medicinal particles, once absorbed into the blood, are distributed throughout the body via circulation.
7. These particles reach various organs and help in eradicating disorders, demonstrating the substance's enhanced therapeutic potential.
8. The Puta process is not just a traditional practice but is grounded in a logical and scientific framework.
9. By transforming the physical properties of metals, the process enhances their bioavailability and therapeutic effectiveness.

Musha (मूषा)

Introduction

1. A Musha is defined as a tool that removes impurities (dosha) from Rasa Dravya (mineral compounds).
2. In contemporary science, Mushas are known as crucibles.
3. Musha are special devices mentioned in Rasa Shastra for processing Rasa Dravya.
4. They are referenced in every text of Rasa Shastra, indicating their equal importance to other devices like:
   - Yantras (instruments)
   - Kosthis (furnaces)
5. There are various types of Musha, including:
   - Samanya Musha
   - Gostani Musha
   - Vrintaka Musha
   - Maha Musha

Definition

मुष्णाति दोषान् मूषेयान् सा मूषेति निगद्यते।। (R.R.S. 10/2)
मुष्णाति दोषान् यस्मात्सा तस्मान्मूषा प्रकीर्तिता। (R.T. 3/2)

A crucible that eradicates the doshas of the drugs subjected to heat in it is called a Musha.

Or

The term 'Musha' is derived from its function of eradicating impurities from the materials subjected to high temperatures within it.

Synonyms

मूषा हि क्रौञ्चिका प्रोक्ता कुमुदी करहाटिका।
पाचनी वन्हिमित्रा च रसवादिभिरीर्यते।। (R.T. 3/1)

1. **Karunchika**: As most of the Mushas are made from the soil obtained from the Karuncha region, the synonym Karunchika is given to them.
2. **Karahatika**: As most of the Mushas are made from the soil obtained from the Karahata region, the synonym Karahatika is given to them.
3. **Kumudi**: As the shape of many Mushas often resembles that of the Kumuda (Lotus) flower, the synonym Kumudi is attributed to them.
4. **Pachini**: As almost all the Mushas are used for Pachana (heating) purposes, they are also called Pachini.
5. **Vahnimitra**: As almost all the Mushas generally tolerate strong heat and behave like a friend towards fire, they are called by the name Vahni Mitra.

Numbers of Musha

1. Rasa Prakasha Sudhakara: - 17
2. Rasa Ratna Samuchchaya: - 16
3. Rasa Kamdehnu: - 06
4. Rasa Tarangini: - 07
5. Rasa Raja sundara: - 02
6. Rasa Chudamani: - 15

Terminologies

1. Musha Payana (मूषा पायना)

द्रव्ये द्रवीभावमुखे मूषाया ध्मानयोगतः।
क्षणमुद्धरणं यत्तन्मूषाऽऽध्मायनमुच्यते।। (R.R.S. 10/31)

The act of briefly removing the medicine-filled, red-hot crucible from the fire after placing it inside the furnace or bhatti is called 'Mushapyayana'. This process is performed when the drug inside the crucible begins to melt, thereby enhancing the heat-withstanding capacity of the crucible.

2. Musha Sandhi Lepana (मूषासन्धिलेपन)

मूषादीनां तु यत्सन्धौ किट्टाद्यैः स्याद्विलेपनम्।
तत्सन्धिलेपनं ख्यातं तज्ज्ञोक्तं सन्धिबन्धनम्।। (R.T. 3/5)

The process of sealing crucibles or other containers with lids is called 'Sandhi-Lepana' or 'Sandhi-Bandhana'. It involves using a sticky mixture prepared by thoroughly combining 'Loha Kitta', wet mud, and other specified materials.

3. Musha Sandhi Bandhana (मूषासन्धिबन्धन)

मूषापिधानयोर्बन्धे बन्धनं सन्धिलेपनम्।
अन्ध्रणं रन्ध्रणं चैव संश्लिष्टं सन्धिबन्धनम्।। (R.R.S. 10/5)

The process of sealing the crucible and its lid (Pidhanaka) is called 'Sandhi Bandhana'. It is also referred to as 'Sandhi Lepana', 'Andhrana', 'Randhrana', and 'Samshlishta'.

4. Pidhanka (पिधानक)

द्रव्यपूरितमूषादेः द्रव्यपातनिवृत्तये।
आच्छादकं भवेद् यत्तु पिधानं तदिहोच्यते।। (R.T. 3/4)

The term 'Pidhana' or 'Pidhanaka' literally means covering or shutting. The lid or covering that prevents the Rasa dravya from spilling out of the Musha pot and aids in handling or lifting the Musha is called a "Pidhanaka."

Uses of Musha

1. Rasa Murchchhana.
2. Rasa Shodhana.
3. Rasa Marana.
4. Rasa Bandhana.
5. Dvanda Melapana.
6. Bija/ Dravya Nirvapana.
7. Satva Patana.
8. Sarana.
9. Dravana.
10. Swedana.

Requirements

General:

द्व्यादानं भवेत्तस्य मृत्तिका लोहमेव च। (R.R.S. 10/3)

- Mritika
- Loha Churna

1. Mritikka

Types

- Balmika Mritika
- Krishna Mritika
- Bhunaga Mritika
- Rakta Mritika
- Shveta Mritika
- Pitta Mritika
- Kaulali Mritika

Grahya Lakshana of Mrittika

सशर्करा पाण्डुरा च वह्नितापसहा चिरम्।
स्थूला च मृत्तिका या स्यात् मूषार्थं सा मतोत्तमा।। (R.T. 3/6)

- Sasharkara- Granular
- Pandura- Pale Coloured
- Vahnipasaha- Stand any degree of temperature.
- Sathula- Heavy Weight.

2. Churna

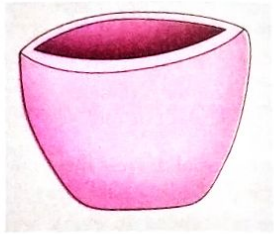
- Pashana Churna.
- Kupi Churna.
- Ishtika Churna.

3. Others

- Dagdha Tusha
- Angara
- Jala
- Mahisha Kshira
- Loha Kitta
- Lavana

1. Samanya Musha (सामान्य मूषा)

या मृत्तिका दुग्धतुषैः शणेन शिखित्रकैर्वा हयलद्दिना च।
लोहेन दण्डेन च कुट्टिता सा साधारणा स्यात्खलु मूषिकार्थे।।
(R.R.S. 10/7)



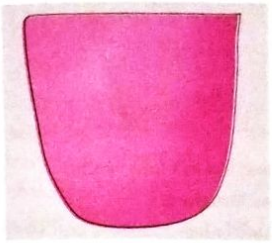
Preparation of Samanya Musha

1. **Ingredients:**
   - **Equal quantities of:**
   - Charcoal (Sikhitra)
   - Ash of husk (Dagdha Tusa)
   - Fibres of jute (Sana)
   - Horseshit (Laddika)
2. **Mixing:**
   - Pound the above materials together along with an equal quantity of selected mud.

3. **Forming the Mixture:**
   - The rigorous pounding yields a sticky and homogenous mixture.
4. **Crucible Preparation:**
   - Shape the mixture into crucibles of the desired size and shape.
5. **Drying and Baking:**
   - Dry the prepared crucibles and then bake them in intense heat.
6. **Usage:**
   - The baked crucibles are used as 'Samanya Musha'.

2. Vajra Musha (वज्रमूषा)

मृदस्त्रिभागाः शणलद्दिभागौ भागश्च निर्दग्धतुषोपलादेः।
किट्टार्धभागं परिखण्ड्य वज्रमूषां विदध्यात् खलु सत्त्वपाते।।
(R.R.S. 10/9)

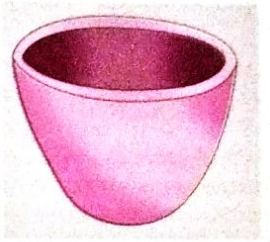


Preparation of Vajra Musha

1. **Ingredients and Ratios:**
   - Selected mud: 3 parts
   - Jute fibre: 2 part
   - Horseshit: 2 part
   - Ash of husk: 1 part
   - Mandura (loha kitta): 0.5 part
2. **Mixing:**
   - Rigorously pound all the ingredients together to obtain a sticky and homogenous mixture.
3. **Crucible Preparation:**
   - Shape the mixture into crucibles of the desired size and shape.
4. **Drying and Baking:**
   - Dry the prepared crucibles and then bake them in intense heat.
5. **Usage:**
   - The baked crucibles are used as 'Vajra Musha'.

3. Yoga Musha (योग मूषा)

दग्धाङ्गारतुषोपेता मृत्स्ना वल्मीकमृत्तिका।
तत्तद्बिडसमायुक्ता तत्तद्बिडविलेपिता।।
तया या विहिता मूषा योगमूषेति कथ्यते।
अनया साधितः सूतो जायते गुणवत्तरः।। (R.R.S. 10/10-11)

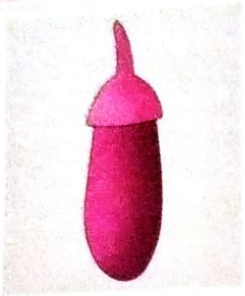


Preparation of Yoga Musha

1. **Ingredients in Equal Quantities:**
   - Ash of charcoal
   - Ash of husk
   - Ant hill mud
   - Vida (a special adhesive prepared using kara dravya, amla dravya, gandhaka, mutra, etc.)
2. **Mixing:**
   - Rigorously pound all the ingredients together to obtain a sticky and homogenous mixture.
3. **Crucible Preparation:**
   - Shape the mixture into crucibles of the desired size and shape.
   - Dry the prepared crucibles.
   - Bake the dried crucibles in intense heat.
4. **Kalka Application:**
   - Prepare the kalka of all the above ingredients.
   - Apply the kalka on all parts of the crucible and dry.
   - Repeat the process of kalka application and drying 3 to 4 times.
5. **Usage:**
   - The crucible, now called 'Yoga Musha', is prominently used for 'Parada Marana'.

4. Gostani Musha (गोस्तनी मूषा)

मूषा या गोस्तनाकारा शिखायुक्तपिधानका।
सत्त्वानां द्रावणे शुद्धौ मूषा सा गोस्तनी भवेत्।। (R.R.S. 10/24)

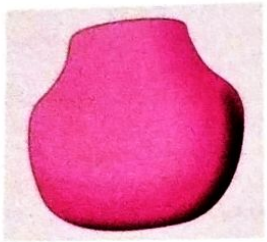


Description of Gostani Musha

1. **Shape and Features**:
   - The crucible is oblong, resembling the shape of a cow's udder.
   - It has a lid (pidhana) on the top.
   - There is an apex (shikha) on the crucible.
2. **Usage**:
   - Gostani Musha is commonly used when closed heating is required.

5. Pakva Musha (पक्वमूषा)

कुलालभाण्डरूपा या दृढा च परिपाचिता।
पक्वमूषेति सा प्रोक्ता पोटल्यादिविपाचने।। (R.R.S. 10/26)



Preparation and Use of Pakwa Musha

1. **Ingredients**:
   - The ingredients for ordinary crucibles and roasted crucibles are the same.
2. **Differences**:
   - Pakva musha crucibles are more roasted in the fire.
   - They are larger in shape, resembling a pot.
3. **Usage**:
   - Pakva musha is used to prepare pottali rasayanas.
4. **Preparation of Pottali Rasayanas**:
   - The drug substance is cooked in liquid sulphur at boiling temperature.
   - The boiling temperature of liquid sulphur reaches up to 444.5°C.
   - The crucible needs to withstand this high temperature for 3 to 12 hours.

6. Maha Musha (महामूषा)

तले या कूर्पराकारा क्रमादुपरि विस्तृता।
स्थूलवृन्ताकवत्स्थूला महामूषेत्यसौ स्मृता।
सा चायोऽभ्रकसत्त्वादेः पुटाय द्रावणाय च।। (R.R.S. 10/28)

Description and Use of Maha Musha

1. **Shape and Structure**:
   - The crucible has a narrow and strong base at the bottom to fix firmly in the ground.
   - It has a wide and spacious body above.
   - The crucible has equal length and width.
2. **Alternative Name**:
   - This crucible is also called 'Sthula Musha.
3. **Usage**:
   - Maha Musha is used for the application of 'puta' (a specific heating technique) to the sattva (essence) of loha (metal), abhraka (mica), swarna maksika (gold ore), etc.

Crucibles

(See fig. next page)

The term "crucible" is derived from the Latin word "crucibulum," meaning a melting pot for metals. A crucible is defined as a vessel made of very refractory material, used for melting and calcining substances that require a high degree of heat.

A crucible is a cup-shaped piece of laboratory equipment used to contain chemical compounds when heated to extremely high temperatures. Crucibles are available in several sizes and typically come with a correspondingly-sized crucible cover (or lid).

Types of Crucibles:

1. Vitreous carbon crucible- 3000°C
2. Silica crucibles- 1600°C
3. Platinum Crucibles- 1200°C
4. Porcelain crucibles- 1050°C
5. Nickel crucibles- 600°C
6. Carbon steel crucibles- 500°C
7. Zirconium crucibles- 450°C

Modern Crucibles and Their Composition

Materials Used:

- Modern crucibles are typically made from silica or China clay (Kaolin).
- China clay, or "chini mati" in Marathi, is a blend of shadoo (modeling clay) and chikkana clay, containing aluminum silicate, sodium silicate, potassium silicate, and calcium silicate.
- Silica crucibles consist of pure silicate SiO_2 (silicon dioxide), forming silica glass, renowned for its chemical resistance and minimal thermal expansion.

Production Process:

- China clay undergoes natural oxidation upon exposure to the atmosphere, transforming into kaolin.
- Kaolin is shaped, heated, and coated with borax powder to enhance its surface properties.

Historical and Modern Materials:

- Historically, crucibles were crafted from platinum.
- Contemporary alternatives include ceramics such as alumina, zirconia, and especially magnesia, which can endure extremely high temperatures.
- Metals like nickel and zirconium have also found recent application in crucible manufacturing.

Design and Functionality:

- Crucible lids are typically designed with a loose fit to allow gases to escape during sample heating.
- Crucibles and lids are available in high form and low form shapes, as well as various sizes.
- Small porcelain crucibles, often sized between 10-15 ml, are commonly employed for gravimetric chemical analysis due to their practicality and durability.

Fire clay is a crucial material in modern crucible manufacturing due to its exceptional heat-resistant properties. Composed of minerals like aluminum, calcium, and magnesium, fire clay crucibles are designed to withstand extremely high temperatures encountered in industrial processes. They are essential in industries where materials must endure thermal stress and maintain durability over prolonged use. The use of fire clay ensures that crucibles can safely contain and process materials at elevated temperatures without compromising structural integrity or performance, making them indispensable tools in metallurgy, ceramics, and other high-temperature applications.

Applications:

- **Metallurgy**: Melting, refining, and casting metals.
- **Chemical Analysis**: Gravimetric and quantitative analysis.
- **Ceramics and Glass**: Melting raw materials for production.
- **Research and Development**: Synthesizing new materials.
- **Jewelry and Precious Metals**: Melting and casting metals.
- **High-Temperature Processes**: Sintering, annealing, heat treatment.

Mudra (मुद्रा)

Etymology

The term "Mudra" originates from the Sanskrit root "Mud," which refer to Seals.

Definition

The process involves sealing a Musha, Kupi or any open equipment using a sticky substance that hardens over time.

Different Varieties of Mudra are:

1. Madana Mudra (मदन मुद्रा)

औदुम्बराख्यवटदुग्धपलं पलञ्च लाक्षापलमृषिपलं त्वथ चुम्बकस्य।
सङ्कुट्यमानमतसीफलतैलमिश्रं सूतस्य जारणविधौ मदनाख्य-मुद्रा।। (Anandkand, page 690)

Preparation of Madana Mudra Adhesive

Ingredients and Quantities:

- Udumbara kshira - 1 pala (50 ml)
- Vata kshira - 1 pala (50 ml)
- Laksha rasa - 1 pala (50 ml)
- Chumbaka loha churna (fine powder of magnetic iron) - 7 pala (350 gms)
- All these ingredients are measured precisely and combined in a 'khalva yantra'.
- 'Atasi taila' is added in the required quantity.

Trituration Process:

- The mixture is pounded and triturated thoroughly in the 'khalva yantra'.
- This process continues until the mixture achieves a very smooth, sticky paste-like consistency.

Application as Adhesive:

- Once the desired consistency is reached, the adhesive paste, known as 'madana mudra', is used to seal the 'musha' (crucible) and its 'Pidhanaka' (lid) during 'parada jarana'.

Purpose and Use:

- Madana mudra serves the purpose of securely sealing the crucible and lid during the process of 'parada jarana, ensuring a tight and effective seal.

2. Hatha Mudra (हठ मुद्रा)

चुम्बकं लौह चूर्णं च क्रोडरक्तेन संयुतम्।
तत्र सर्वं प्रदातव्यं घनघातेन ताडयेत्।।
सन्ध्यारभ्योदयो यावत्सूर्यबिम्बं च दृश्यते।
हठमुद्रेति विख्यातं सर्वसिद्धैर्नमस्कृता।। (An.Kan., पृ० 689)

Preparation and Use of 'Hata Mudra' Adhesive

Ingredients and Preparation:

- 'Chumbaka loha churna' (fine powder of magnetic iron) and 'pig's fresh blood' (kroda rakta) are taken in equal quantities.
- These ingredients are triturated thoroughly in a 'khalva yantra' from sunset to sunrise, approximately 12 hours.

Achieving Consistency:

- The mixture is triturated until it reaches a very smooth, sticky paste-like consistency.

Application as Adhesive:

- This adhesive paste, known as 'hata mudra', is used to seal the 'musha' (crucible) and its 'pidhanaka' (lid) during "parada jarana".

Optimal Conditions for Trituration:

- Trituration during the cooler hours of night helps maintain the liquid part of the mixture longer, aiding in the formation of a better and stickier adhesive paste.

Sandhi Bandhana Material

मूषादीनां तु यत्सन्धौ किट्टाद्यैः स्याद्विलेपनम्।
तत्सन्धिलेपनं ख्यातं तच्चोक्तं सन्धिबन्धनम्।। (R.T. 3/5)

The ancient alchemical process of Sandhi Lepana or Sandhi Bandhana involves sealing the joints of crucibles (known as Musha) and other apparatus like clay saucers (Sharava) with a specialized paste. This paste is typically composed of various materials, such as Kitta (lac), Louha Churna (iron dust), and other ingredients, depending on the specific requirements of the process.

This technique is employed in alchemy and metallurgy (Rasa Shastra) to ensure a secure and airtight seal during the preparation of Bhasma (calcined metal or mineral ash) or other medicinal compounds.

Purpose of Sandhi Bandhana

This technique is crucial in the disciplines of alchemy (Rasa Shastra) and metallurgy, where the integrity of the apparatus directly affects the outcome of the process, particularly in the preparation of Bhasma (calcined metal or mineral ash) and other medicinal compounds. The objectives of employing this sealing method are:

1. **Preventing the Escape of Volatile Substances**: The sealing material ensures that no volatile components are lost during heating, which is essential for maintaining the efficacy of the compounds being prepared.
2. **Maintaining the Desired Temperature**: By creating an airtight environment, it allows for the retention of heat within the apparatus, which is critical for processes like calcination, sublimation, and other alchemical transformations.

Preparation of Sandhi Bandhan Material

वल्मीकमृत्तिकांऽगारपूरणं लोहकिट्टकम्।
श्वेतपाषाणकं चैव तत्सर्वं चूर्णयेत्समम्।।
सर्वतुल्यं दग्धतुषं तोयेनैव विमर्दयेत्।
मूषादिसंपुटं कुर्यात्सर्वसंधि प्रलेपनम्।।
(R.R.S., R.Ka.Dha. 1/183–184)

Ingredients

- Valmika Mrittika (termite mound clay)
- Coal
- Louha Kitta (iron filings or slag)
- Shveta Pashana (calcium carbonate)

Procedure

These materials are finely ground together with water to create a homogeneous paste. This paste is then applied to seal the joints of crucibles and similar equipment, ensuring an airtight and durable seal that can withstand high temperatures and prevent leakage.

लेहवत्कृतबब्बूल क्वाथेन परिमर्दितम्।
जीर्णकिट्टरजः सूक्ष्मं गुडचूर्णसमन्वितम्। (R.R.S. 9/62)

Ingredients

- Decayed Lauha Churna (iron dust)
- Guda (jaggery)
- Babbola Kvatha (decoction of Acacia bark)

Procedure

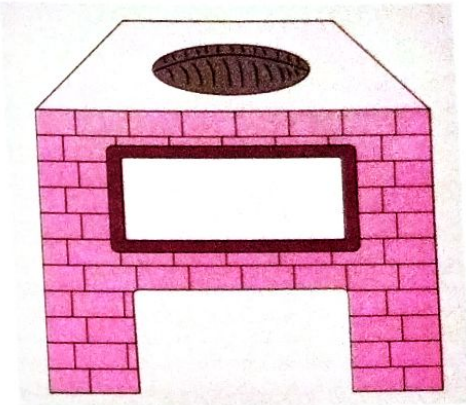
The ingredients are triturated together until they achieve a thick consistency similar to that of Leha (a paste). This mixture is specifically formulated for use in environments where water is present, as it provides a more resilient seal in such conditions.

Importance of Sandhi Bandhana

- Preserve the purity and efficacy of the final product.
- Control the internal temperature to facilitate the desired chemical reactions.
- Prevent contamination and the loss of any material during the heating or processing stages.

By using appropriate sealing materials and techniques, practitioners of Rasa Shastra can maintain the high standards required for successful alchemical and medicinal preparations.

Chullika (चुल्लिका)



Definition

A chullika, or fireplace, is used primarily for heating substances or drugs using fire.

Size Determination

The size of a chulhika depends on the quantity of substance intended to be heated.

Construction Materials

Traditionally, chullikas are built from bricks or soft clay for smaller sizes; in modern times, cement is commonly used.

Functional Components

1. **Lower Outlet:** Wood sticks are burnt here to produce fire.
2. **Upper Outlet:** The substance or drug to be heated is placed in a container at this outlet.

3. **Middle Outlet:** A horizontal sieve is fixed at this level, where live coals from the fireplace can be placed to heat the drug substance effectively.

Evolution: Over time, chullikas have adapted to different materials and construction methods while maintaining their core function of controlled heating through direct fire exposure.

अङ्गारधानिका ख्याता हसन्ति च हसन्तिका।
अङ्गारशकटी चापि हसनी च निगद्यते।।
अङ्गारधानिका ह्येषा मृदुद्रव्यप्रसाधिका।
वङ्गादीनां द्रावनादौ विशेषेण प्रयुज्यते।। (R.T. 3/22-23)

Synonyms: Angaradhanika, Hasanti, Hasantika, Angarsakati and Hasani.

Uses

1. Heating and melting the mridu dravya.
2. Shodhana Purpose. (E.g. Naga, Vanga).
3. Dhalana Karma.

Koshthi (कोष्ठी)

Introduction

Koshthi refers to various sizes and types of heating systems used for the extraction and purification of sattva. These systems are specifically designed to ensure ample oxygen supply to the furnace during the process, thereby maintaining intense temperatures required for processing the materials.

The primary purpose of koshthi is to extract sattva, which is essential in certain minerals for therapeutic purposes. Sattva bhasma derived from these minerals is known to be more potent compared to bhasma derived from the same raw materials without sattva extraction. In some alchemical processes, such as for abhraka sattva and makshika sattva used in Dvandavana, sattva extraction becomes crucial.

Therefore, knowledge of koshthi is indispensable for the extraction and purification of sattva, making it an integral part of the fundamentals of Rasashastra, the ancient Indian alchemical tradition.

Definition

सत्त्वादिपातनाद्यर्था द्रव्यद्रावनसाधिका।
वह्निसन्धानिका या तु कोष्ठिका सा निगद्यते।। (R.T. 3/24)

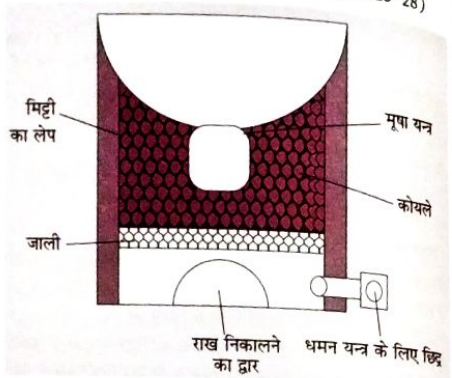
For the extraction of dravya sattva and for the purpose of dhalana, special ovens known as 'koshthika' are used. Since all four sides of the 'koshthika' are covered, the intensity of the fire will be higher.

सत्त्वानां पातनार्थाय पतितानां विशुद्धये।
कोष्ठिका विविधाकारास्तासां लक्षणमुच्यते।। (An.Kan. 1/16/194)

To separate an Active Principle (Sattva-Patana) and purify it, fireplaces of various shapes and sizes are used.

1. Angara Koshthi (अङ्गार कोष्ठी)

नृपहस्तमितोत्सेधे तददर्धायामविस्तृता।
मध्यतश्चतुरस्रा च मृदा च परिलेपिता।।
चतुरङ्गुलमानेन रन्ध्रेण परिशोभिता।
नालिकां समकोणाञ्च रन्ध्रे तिर्यङ् निवेशयेत्।।
नालिकाया मुखे चैव भस्त्रावक्त्रं निवेशयेत्।
आपूर्य कोकिलैः कोष्ठीं द्रव्यमूषान्वितां धमेत्।।
अङ्गारकोष्ठिका ख्याता द्रव्यद्रावनसाधिका।
सत्त्वानां पातने चैव विशेषाद्विनियुज्यते।। (R.T. 3/25-28)



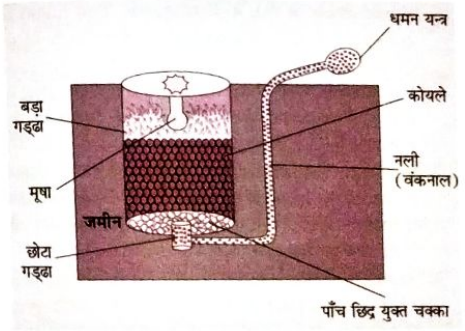
1. **Dimensions and Shape of the Fireplace:**
   - Built on a plane ground using bricks.
   - Interior has a quadrangular shape with dimensions:
   - Height: One nripahasta (22 inches).
   - Length and Width: Half nripahasta (11 inches each).
   - Ensures all corners inside comply with these dimensions.
2. **Clay Coating:**
   - Inner and outer walls evenly covered with fine soft clay.
   - Ensures heat/fire from inside does not escape.

3. **Opening and Blower Connection:**
   - Round opening of 4-angula diameter created at the base of any sidewall.
   - Metal pipe of required length fixed in the opening.
   - Outer opening of the pipe connected with a blower.
4. **Preparation for Dhalana or Sattvapatana:**
   - Base filled with a layer of good quality charcoal.
   - Drug-filled and sealed crucibles placed firmly on the charcoal layer.
   - Another layer of charcoal filled above the crucibles and ignited.
5. **Functionality and Usage:**
   - Designed specifically as an 'angara-koshthika'.
   - Used for the process of 'dhalana' or 'sattva-patana' of selected drugs.

This angara-koshthika fireplace is meticulously constructed to facilitate the controlled heating and processing of drugs through traditional methods.

2. Patala Koshthi (पाताल कोष्ठी)

वितस्तिविस्तृतं गर्तं भूमौ कुर्याद्विधानतः।
तन्मध्ये वर्तुलं छिद्रं निम्नवेशे प्रकल्पयेत्।।
गर्तमध्यगते छिद्रे तिर्यङ् नालं निवेशयेत्।
नालवक्त्रे च भस्त्राया मुखं सम्यङ् निरोधयेत्।।
द्रव्यमूषां कोष्ठिकायां निधाय भस्त्रया धमेत्।
पातालकोष्ठिका ह्येषा मृदुद्रव्यप्रसाधिका।। (R.T. 3/29-31)



1. **Dimensions and Layout:**
   - A cylindrical pit measuring 12 angula (1 vitasti) in length is dug inside the earth.
   - Within this larger pit, a smaller cylindrical pit measuring 4 angula in length is positioned at the base.
2. **Tube and Blower Setup:**
   - The base of the smaller pit is fixed with one end of a strong tube.
   - This tube extends from the smaller pit to the surface of the earth, adjacent to the larger pit.
   - The other end of the tube is connected to a 'vankanala' (bellows or air blower) placed beside the larger pit on the ground.
3. **Mesh Installation:**
   - A strong mesh (lattice) is securely fixed at the top of the smaller cylindrical pit.
4. **Charcoal and Crucibles:**
   - The base of the larger pit is filled with a layer of high-quality charcoal.
   - Drug-filled and sealed crucibles are placed firmly on top of this charcoal layer.
   - Another layer of charcoal is spread over the crucibles and ignited.
5. **Regulation of Air Blowel:**
   - The bellows (air blower) is used to regulate the airflow into the smaller pit.
   - This controlled airflow ensures proper combustion and heat distribution within the furnace.
6. **Function and Application:**
   - Known as 'patala-koshthika', this furnace is specifically designed for 'sattvapatana' (purification) of soft drugs ('mridu dravya').
   - During operation, ash generated from the burning charcoal in the larger pit filters through the mesh into the smaller pit.
   - The collected ash at the base of the smaller pit is an essential byproduct of the purification process.

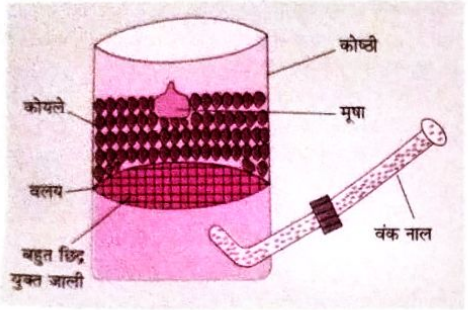
The patala-koshthika furnace exemplifies traditional craftsmanship tailored for the precise purification of soft drugs, integrating efficient airflow control and ash collection mechanisms.

3. Gara Koshthi (गारकोष्ठी)

द्वादशाङ्गुलनिम्ना या प्रादेशप्रमिता तथा।
चतुरङ्गुलतश्चोर्ध्वं बलयेन समन्विता।।

भूरिच्छिद्रवतीं चक्रीं वलयोपरि निक्षिपेत्।
शिखिग्रांस्तत्र निक्षिप्य प्रधमेद्वङ्कनालतः॥
गारकोष्ठीयमाख्याता मृष्टलोहविनाशिनी॥ (R.R.S. 10/43–44)

1. **Dimensions and Structure**:
   - Quadrangular oven measuring 12 angula in height.
   - Length and width are described as 'one pradesa' (sufficient size).
2. **Location and Fixtures**:
   - Built either inside the earth as a pit or on a plane ground.



   - At the base of the pit, approximately 4 angula above ground level, a strong iron sieve is securely fixed into the walls of the koshthi.
3. **Fuel and Heating Process**:
   - Charcoal is filled above the iron sieve.
   - 'Samputita Aushadha Dravya' (refined medicinal substances or in this context, possibly refined metals) is placed on the charcoal.
   - The substances are ignited to initiate the heating process.
4. **Heat Intensification**:
   - Intensity of heating is maintained with the assistance of a blower known as 'vankanala'.
5. **Purpose and Application**:
   - Known as 'Gara Koshthi', this specialized oven is primarily used for melting metals such as gold, silver, and copper.
   - The objective is to purify these metals by removing minor alloy metals present in them.

This Gara Koshthi is designed and utilized specifically for metallurgical processes, ensuring efficient melting and purification of valuable metals through controlled heating.

Sattvapatana Bharastri

The term Sattvapatana Bharastri refers to a specialized process of extracting or isolating the "Sattva" or essence of a metal or mineral. This technique is a key aspect of alchemy, wherein metals and minerals are purified, processed, and rendered suitable for therapeutic applications:

1. **Sattva**: Satva denotes the pure essence or active principle of a metal or mineral. The extraction of Satva involves separating medicinally potent parts from impurities. The resulting material is considered to possess therapeutic benefits and is used in various Bhasma (ash) preparations.
2. **Patana**: Patana means "extraction" or "separation". It refers to the process of extracting the essence of a substance. Specifically, in the context of Satva Patana, it involves methods to separate the essential mineral or metallic content from its ore or impurities.
3. **Bharashtri**: Bharashtri refers to a particular type of crucible or vessel used in alchemical processes. It is utilized in heating and extraction processes required for the isolation of Satva. The Bharashtri is typically constructed to withstand high temperatures necessary for extracting the essence from metals and minerals.

The Process of Sattvapatana in Bharastri

1. **Preparation of the Raw Material**: The metal or mineral is first purified using various techniques (Shodhana). These methods may include treatments with herbal juices, cow's urine, or other substances to cleanse and detoxify the material.
2. **Placement in the Crucible (Bharashtri)**: The purified material is placed in a Bharastri, a crucible made from specific clay or other refractory materials that can endure high temperatures.
3. **Heating and Extraction**: The Bharashtri is heated in a furnace to a particular temperature, facilitating the separation of the essence or satwa from remaining impurities. This step may involve regulating the heat at different levels over various durations, depending on the material used. The extraction process requires expert knowledge of heat management, timing, and the specific properties of the substances involved.
4. **Collection of Satva**: The pure Satva or essence is collected, while the impurities remain in the Bharashtri. This extracted Satva is then processed further or used in formulations like Bhasma (calcined powders).

Importance

Satvapatana Bharashtri is vital in Rasa Shastra as it ensures the extraction of therapeutic elements of metals and minerals in their most potent and pure form. The obtained Satva is considered highly effective and safe for use in treating various health conditions.

Gas Stove

Definition

A gas stove is a kitchen appliance that uses flammable gases such as natural gas, propane, or butane to cook food. It offers a variety of heat levels and is the perfect solution for domestic or commercial kitchens that need an instant adjustable high-level source.

Working Principle

A gas stove burns and therefore uses combustible fuel. The basic steps include:

1. **Gas Supply:** The gas stove runs on a connection with the gas, and there can be two types of supply: a central natural gas line or a portable cylinder (like propane).
2. **Flame Ignition:** When the gas knob is opened, the supply line allows gas to flow into the burner through a control valve. Air enters the engine at one end, while gas is vaporized and sprayed into that air in a specific proportion to form a volatile combination. Ignition can be manual (with a lighter or matchstick) or automatic, using an electric igniter built-in that creates sparks.
3. **Combustion:** The mixed gas and air ignite, creating a flame used for cooking.
4. **Heat Control:** Gas cooking offers distinct heat control, allowing precise temperature adjustments.
5. **Exhaust:** Burning gas produces heat, water vapor, and carbon dioxide, which are released into the kitchen environment. Advanced models may have ventilation systems for exhaust gases.

Instrumentation

- **Burners:** These parts of the stove allow gas to burn and produce heat. Different stoves have varying types and numbers of burners.
- **Control Knobs:** These regulate the gas flow to the burners, allowing you to adjust the flame size and intensity.
- **Ignition System:** It can be manual or automatic (piezoelectric/electric ignition). Newer gas stoves usually have automatic ignition.
- **Gas Valves:** These control the gas flow from the supply to the burners.
- **Thermocouples:** Safety devices that automatically shut off the gas supply if the flame goes out.
- **Gas Pressure Regulator:** Ensures that the stove receives gas at a safe and consistent pressure.

Advantages

1. **Speedy Cooking:** Gas stoves provide instant heat, allowing you to start cooking quickly.
2. **Precise Temperature Control:** Flame regulation allows for precise cooking temperatures.
3. **Economic:** Gas is often cheaper than electricity, making gas stoves economical to operate.
4. **Compatibility:** Gas stoves work with all types of cookware, unlike induction stoves.
5. **Reliability:** Gas stoves can operate without electricity, as long as there is a gas supply.

Disadvantages

1. **Safety Concerns:** There's a risk of gas leaks, which can lead to fires or explosions if not properly managed.

2. **Heat Loss:** Gas stoves are less efficient than induction stoves, as some heat is lost to the surrounding environment.
3. **Environmental Impact:** Burning natural gas emits CO_2, a significant greenhouse gas.
4. **Maintenance:** Gas stoves require regular cleaning and maintenance to prevent burner clogs and ensure safety.
5. **Ventilation:** Adequate ventilation is essential to prevent the buildup of harmful gases like carbon monoxide in the kitchen.

Applications

1. **Domestic Kitchens:** Gas stoves are commonly used in households for daily cooking.
2. **Commercial Kitchens:** They are vital in restaurants, catering companies, and other food service industries due to their reliability and control over cooking temperatures.
3. **Portable Camping Stoves:** Smaller gas stoves designed for camping are popular for providing a reliable heat source outdoors.
4. **Laboratories:** Gas stoves or Bunsen burners are used in some scientific laboratories for heating substances during experiments.

Hot Plate

A hot plate is a portable heating device with a flat surface, typically powered by electricity or gas.

Working Principle

A hot plate (sometimes called a burner or Aspirator) works on the principle of electrical resistance heating. The heat is produced when an electric current passes through a resistive heating element due to the resistance of the material. The heat is finally transferred to the hot plates where it has a large surface for regular cooking, heating, or other laboratory applications.

Construction

The part of a hot plate usually contains the following:

1. **Heating Element:** The element that represents more than half of the energy used during printing, made of ni-chrome wire usually embedded in a ceramic or metallic plate. When electric current reverses through this substance, it gets hot.
2. **Top Plate:** A flat surface to which materials are added for heating. Usually crafted from aluminum, ceramic, or stainless steel to be durable and heat-resistant with even heat dispersion.
3. **Temperature Control:** A thermostat or electronic control system is built in for controlling the temperature. This lets a user meet the preferred temperature and maintain it.
4. **Insulation:** Insulating materials wrap around the heating elements inside and outside to reduce heat loss, but also to protect internal components of the electric heater.
5. **Casing:** The body, basically of heat-resistant plastic or metal, houses all the components and provides a user interface.
6. **Power Supply:** It is the electrical power connection that delivers the required voltage and current to the heating element.

Advantages

- **Mobility:** As hot plates are semi-portable and lightweight, they can be carried around from one place to another effortlessly.
- **Uniform Heating:** It is important for laboratory experiments or cooking to have uniformly heated surfaces, which this flat surface provides.
- **Thermostatic Control:** Some hot plates come with settable thermostats, available in the best options, offering sufficient control for different tasks.
- **Safety Features:** A few hot plates have timers, automatic shut-off mechanisms, thermal

cutouts, or temperature limiters that prevent overheating.

- **Adaptability:** They can be utilized in various applications, from cooking to laboratory experiments.

Disadvantages

- **Lowest Heating Capacity:** Hot plates do not get as hot as a process heating element for industrial purposes.
- **Slow Heating:** Hot plates might take more time to reach the required temperature than other heaters.
- **Heat Distribution Issues:** Some models may have heat distribution only to portions of the griddle, especially if they're larger in size.
- **Energy Allocation:** Running at high temps 24/7 can likely consume a significant amount of electricity.

Applications

- **Laboratory Use:** Most commonly used in laboratories to heat chemicals, solutions, or samples. Hot plates can be an ideal option when controlled warming is required in experiments.
- **Cooking:** Commonly used in kitchens where traditional stoves are not available or practical.
- **Industrial:** Used in environments where industrial heating occurs (warming fluids, softening materials, or activating adhesives).
- **Field Research:** Portable hot plates are used in field research to heat different samples or prepare materials directly on-site.
- **Educational Demonstrations:** Used in schools to demonstrate experiments involving heating and physics.

Heating Mantle

Definition

A heating mantle is a laboratory device used to apply heat to containers, such as round-bottom flasks, with precise and even temperature control. It consists of an insulated body that houses a heating element, which surrounds the container, providing uniform heat distribution.

Working Principle

The working principle of a heating mantle is based on electrical resistance. The heating element inside the mantle, typically made of nichrome or similar material, generates heat when an electric current passes through it. The generated heat is transferred to the container in contact with the mantle, evenly heating the contents. The mantle's insulation ensures that the heat is focused on the container rather than dissipating into the surrounding environment.

Construction

A typical heating mantle consists of the following components:

1. **Outer Casing:** Usually made of metal or fiberglass, providing structural support and protection.
2. **Heating Element:** The core component, often made of nichrome wire, embedded in the mantle's inner lining.
3. **Insulation:** A layer of insulating material surrounds the heating element to prevent heat loss and ensure efficient heating.
4. **Temperature Control:** Many heating mantles include a built-in temperature control mechanism, such as a variable power supply or a thermostat, allowing precise regulation of the heating element.
5. **Support Structure:** Some models come with a support stand or clamps to hold the flask securely during heating.

Advantages

1. **Uniform Heating:** The design allows for even distribution of heat around the container, reducing the risk of localized overheating or thermal shock.
2. **Safety:** The insulated design minimizes the risk of burns or fire, compared to open flames or hot plates.
3. **Temperature Control:** Provides precise control over the heating process, which is crucial for sensitive reactions.
4. **Versatility:** Available in various sizes and shapes to accommodate different types of laboratory glassware.
5. **Energy Efficiency:** The insulation and focused heating reduce energy consumption.

Disadvantages

1. **Limited Temperature Range:** Not suitable for applications requiring extremely high temperatures.
2. **Fragility:** The heating elements and insulation materials can be delicate, requiring careful handling.
3. **Cost:** Generally more expensive than simpler heating methods, such as hot plates or Bunsen burners.
4. **Specific Use:** Designed primarily for round-bottom flasks, limiting its use with other types of glassware.

Applications

1. **Chemical Synthesis:** Widely used in organic chemistry for heating reactions, especially those requiring reflux conditions.
2. **Distillation:** Employed in distillation processes where uniform heating is necessary to maintain the correct boiling point of the liquid.
3. **Extraction:** Used in Soxhlet extraction setups to maintain consistent temperatures over prolonged periods.
4. **Evaporation:** Useful in reducing solvent volume by heating, particularly in rotary evaporators.
5. **Crystallization:** Helps in controlling the temperature during the crystallization process, leading to uniform crystal formation.

Induction Stove

Definition

Induction, when a conductor is subjected to varying magnetic field it produces electromotive force (e.m.f).

Principle

Electromagnetic Induction is governed by Faraday's Law: The induced emf in any closed circuit path is equal to the time rate of change of the magnetic flux through the Learn electrical terminology on Circuit Description 4 min read

Faraday's Law: The induced EMF in a closed loop is equal to the rate of change of magnetic flux times constant K.

Lenz's Law: The induced current (and EMF) is in a direction that tends to oppose the change in magnetic flux inducing it. The negative sign (trapped flux) of Faraday's Law.

Construction

The common induction setup construction consists of:

- **Coil of Wire:** A conductive material (copper wire) wound into coil. The EMFstar depends again on the geometry of the coil and its number of turns.
- **Magnet or Electromagnet:** Supplies the alternating magnetic field required for induction.
- **Core Material (Optional):** One can use a ferromagnetic core to focus and channel the magnetic flux lines across the coil, leading to enhanced induction.

Advantages

1. **Contactless Power Transfer:** Induction means power can be transferred without contact so it is useful for things like wireless charging.
2. **High Efficiency:** Induction can be quite efficient when properly designed with good materials and configuration.
3. **Longevity:** Primary power transfer does not involve moving parts, reducing wear and tear on the wheel bearings.
4. **Safety:** Reduces live electrical contact exposure (up to 50% smaller) carrying lower risk for various applications like the safe-charging of electric vehicles.

Disadvantages

1. **Heat Generation:** Some inductive processes produce heat, necessitating further cooling solutions.
2. **Limited range:** Power transfer efficiency drops rapidly as the transmitter and receiver are moved away from each other.
3. **Inductive:** Inductive systems, especially the high-quality cores or complex coils that are needed for precision functions will tend to be expensive as well.
4. **Magnetic Interference:** Induction will create interference to other electronic devices and not properly shielded.

Applications

1. **Transformers:** A transformer is based on the principle of electromagnetic induction, and they are used to increase or reduce voltage levels.
2. **Induction Motors: -** They are the most used motors in industries and home applications (tanks, range hoods....et) work based on induction rule to transfer electrical energy into mechanical energy.
3. **Wireless Charging:** To charge all smartphones, electric vehicles and more gadgets without the use of physical connectors.
4. **Inductive Sensors**: These sensors are employed in metal detectors, proximity sensors and other sensing technologies.
5. **Induction Heating**: Industrial processes such as forging, welding, or cooking (induction cooktops)

Hot Air Oven

Definition

A Hot Air Oven is a laboratory equipment used for sterilization and drying of glassware, instruments, powders, and other items that can withstand high temperatures. It uses dry heat to kill microorganisms, making it essential in laboratories, medical facilities, and research settings.

Principle

The Hot Air Oven operates on the principle of dry heat sterilization, which involves using high temperatures to destroy microorganisms by causing the denaturation of proteins and oxidative damage. The hot air circulates within the chamber, evenly distributing heat to ensure thorough sterilization.

Construction

The construction of a Hot Air Oven typically includes:

1. **Outer Body:** Made of mild steel, often coated with epoxy powder to prevent corrosion.
2. **Inner Chamber:** Constructed from stainless steel to provide durability and easy cleaning.
3. **Insulation:** The space between the outer and inner chamber is insulated with glass wool

or asbestos to prevent heat loss and maintain temperature.

4. **Heating Elements:** Usually located at the bottom and/or sides of the oven, made of high-quality nichrome wire, to provide uniform heating.
5. **Temperature Control:** A thermostat or digital PID controller to set and regulate the desired temperature.
6. **Air Circulation:** A fan or blower to circulate hot air within the chamber, ensuring uniform temperature distribution.
7. **Shelves:** Removable and adjustable trays made of stainless steel for placing items to be sterilized.
8. **Door:** Fitted with a gasket to ensure a tight seal and prevent heat leakage, often with a glass window for monitoring.

Advantages

1. **Efficient Sterilization:** Provides effective sterilization for materials that are heat-stable.
2. **Uniform Heating:** Ensures consistent temperature distribution through forced air circulation.
3. **No Moisture:** Unlike autoclaves, hot air ovens use dry heat, making them suitable for moisture-sensitive items.
4. **Safety:** Equipped with safety features such as over-temperature protection.
5. **Low Maintenance:** Simple construction with minimal maintenance requirements.

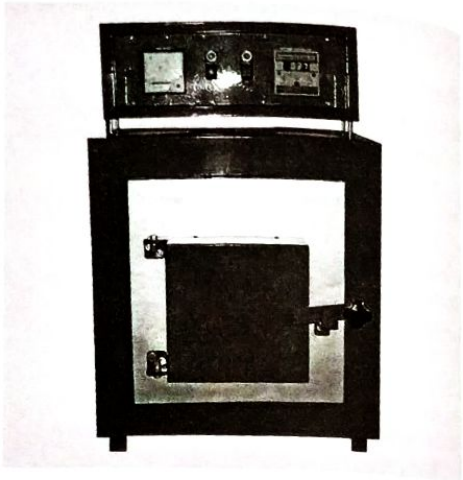
Disadvantages

1. **Slow Process:** Sterilization takes longer compared to moist heat methods like autoclaving.
2. **Not Suitable for Heat-Sensitive Items:** Items that can't withstand high temperatures may be damaged.
3. **High Energy Consumption:** Requires significant power to maintain high temperatures.
4. **Risk of Overheating:** Improper use or malfunction of temperature control can lead to overheating and damage to items.

Applications

1. **Sterilization of Glassware:** Commonly used in laboratories to sterilize glass pipettes, flasks, and test tubes.
2. **Sterilization of Metal Instruments:** Ideal for sterilizing surgical and dental instruments.
3. **Drying:** Used for drying powders, oils, and heat-resistant solids.
4. **Material Testing:** In industrial settings, it is used for testing the stability of products under high temperatures.
5. **Baking and Curing:** Employed in industrial processes such as baking, curing, and annealing materials.

Muffle Furnace



Definition

A muffle furnace is a type of high-temperature heating device that can be used for various applications regarding laboratories and industrial forensic settings. It was Refractory Material Lined Chamber as Heating Element Isolation Which Avoids Contamination. Muffle Furnaces are designed for applications that require high temperatures. Therefore, the materials intended to be processed by these furnaces are ashing and sintering.

Types of Muffle Furnaces

1. **Box Muffle Furnace:** It comprises a box type chamber hence used for general laboratory heating purposes.

2. **Tube Muffle Furnace:** similar to a tube furnace in which cylindrical chamber and is generally used for the continuous process (ex– passing material through tubing).
3. **Crucible Muffle:** Furnace made with a crucible holder designed for the melting of metals and other materials in a controlled environment.
4. **Table-top Muffle Furnace:** Compact and can be moved, ideal for small scale lab applications.
5. **Industrial Muffle Furnace**: So, these are the big and heavy-duty muffle furnaces made for large scale industrial purposes like heat treatment of materials.

Working Principle

In a muffle furnace, heat is produced by the electric heating elements of nichrome or silicon carbide which are placed outside the inner chamber. The heat reflection moves it to the inner case, which is coated with refractory material that keeps and distributes hot temperature uniformly. An isolated design prevents heated material from meeting heating elements and lowers the risk of contamination. Thermocouples and digital controllers allow for accurate regulation of temperature.

Construction

1. **Outer Casing:** Typically made stainless steel with a heat resistant paint.
2. **Enclosure:** An inner chamber (usually Alumina or ceramic which are refractory) that can withstand high temperatures and insulates the heated plate.
3. **Heating Elements:** They are located outside the inner chamber and commonly made of materials like nichrome or silicon carbide.
4. **Insulation:** Ceramic fiber high-density wool available in suitable thickness or alternatively refractory bricks can be used between outer casing and inner chamber for minimum heat loss.
5. **Temperature Control System:** Thermocouples, Digital controllers and programmable logic for setting, monitoring temperature.
6. **Door:** The door is insulated and contains a safety lock to retain the temperature that has been set by you.

Advantages

1. **High-Temperature Capability:** Temperatures to 1800°C.
2. **No Heat Contamination:** No contact between heating elements and your sample no contamination.
3. **Precision Temperature Control:** Maintaining accurate temperature levels with digital controllers.
4. **Consistent Heating**: Guarantees uniform heating across the chamber.
5. **Universal:** Works with a wide variety of materials and use cases.

Disadvantages

1. **High Energy Consumption:** Needs lots of electricity for high temperature operation.
2. **Long heating & cooling times:** It takes a lot of time and energy to reach the desired temperature each time you use it, but also when trying to cool off once encounters.
3. **Initial Cost:** Construction cost is expensive as special type materials are used in the performing of its operations like storage tank and radiation protection.
4. **Space Requirement:** Models with a larger volume footprint such as this often require outright buying entire shop floor space in laboratories or industrial equipment.

Applications

1. **Ashing:** Takes place where the individual will determine ash content in samples — for example, food & chemical analysis.
2. **Heat Treatment:** the annealing, hardening and tempering of metals and alloys.
3. **Sintering:** Powder materials heated until they're solid parts
4. **Testing of materials:** Analyse the thermal activities and stresses subjected in material.
5. **Ceramics Production:** The process of firing ceramics and pottery to bring the finished product up to snuff in terms of hardness, stability.
6. **Glass Treatments:** Anneal and temper glass to increase its power.

7. **Research and Development:** There are being used in R&D for researching on the impacts of temperature applied over various kinds of materials.

Heating Material

Solid

1. **Kashtha**: Kashtha refers to specific types of wood used as fuel in therapeutic practices. Common types include Arani (Premna integrifolia) for its moderate, consistent heat, Palasha (Butea monosperma) for its purifying properties, and Samidha sticks like Arjuna and Khadira (Acacia catechu), chosen for their specific medicinal and energetic qualities. These woods are selected for both their burning properties and their therapeutic effects during treatments.
2. **Coal**: Cow dung cakes or Wood charcoal are commonly used for heating, valued for their steady heat and purifying properties.
3. **Kshara**: Kshara is employed to provide uniform and controlled heat during the preparation of medicines, especially Bhasma. The process typically involves heating the Kshara material until it reaches a temperature that allows it to deliver steady and consistent heat indirectly to the material being processed. This method ensures that heat is evenly applied, preventing overheating or inconsistent processing.

   Kshara is often used for indirect heating. For example, in the preparation of Hartala Bhasma, Punarnava Kshara is utilized. The alkali indirectly heats the Haratala, ensuring uniform heat distribution, which is essential for proper calcination and detoxification.
4. **Lavana**:
   - Lavana refers to salt, while Lavana Yantra is a traditional apparatus designed for indirect heating, commonly used during the preparation of specific medicines.
   - Salt in the outer vessel serves as an even, controlled source of heat. The apparatus is placed over a heat source, and the temperature is slowly increased, with the salt maintaining a stable temperature throughout.
   - Aacharya Sadananda Sharma's Rasa Tarangini (Chapter 5, Verses 26-30) details the significance of using indirect heat for preparing mercury-based medicines, describing the Lavana Yantra as a critical tool in creating the proper heating conditions for sensitive formulations like Rasasindura.
   - Heating continues until the desired characteristics of Rasasindura, such as a change in color to red and the sublimation of mercury, are achieved. The indirect heat provided by the Lavana Yantra ensures a controlled environment, minimizing the risk of overheating or burning the delicate substances.

Purpose of Using Lavana Yantra

- **Controlled Heat Distribution**: Provides uniform and regulated heating, essential for maintaining the quality and potency of the Rasasindura.
- **Protection from Direct Heat**: Prevents direct flame contact, reducing the risk of altering the chemical properties of the ingredients.

5. **Baluka:**
   - Baluka Yantra is a traditional device used for indirect heating. The term Baluka translates to sand, which serves as the medium for controlled, uniform heat in this device.
   - The device consists of a vessel made of iron or clay, filled with sand. The sand acts as the medium for heat transfer to another vessel that contains the substances to be heated or processed. Using sand allows for slow, consistent heat distribution, essential for preventing direct burning and ensuring a steady temperature.
   - The vessel with sand is heated from below. The heat is gradually transferred through the sand to another container, which holds a medicinal formulation. This method of indirect heating ensures that the substance receives gentle, sustained heat without direct contact with flames, which is crucial for delicate preparations requiring precise temperature control.

Applications: Baluka Yantra is primarily used in preparing Bhasma (calcined metals and minerals) and in certain herbal extractions where uniform, controlled heating over a long duration is necessary. It is also used in procedures like Pottali Sveda, a form of fomentation using herbal powders wrapped in cloth.

6. **Shakrit**: Shakruta: Referring to dung, this substance plays a crucial role in providing heat eg.- Puta Putapaka, Tapta Khalva Yantra process.

   E.g.- Cow dungs, Goat dungs, etc.

Tapta Kalva Yantra Process

1. **Pit Formation**: A pit is dug in the shape of a khalva (traditional mortar).
2. **Shakruta Addition**: Goat dung is placed into the pit.
3. **Ignition**: The dung is set on fire, producing heat.
4. **Mortar Placement**: After the dung is burned, a mortar is positioned over the pit to utilize the generated heat for processing the materials within.

Usage

- Parada Samanaya Shodhana
- Parada Mardana Samskara

7. **Dhanya:**

Dhanya can also refer to grains used as a heating material to help maintain a consistent temperature during certain processes. For instance, in procedures like Dhanya Abharaka or during fermentation procedure (Asava/ Arishtha), grains are utilized to retain and evenly distribute heat. This ensures that the process occurs under stable thermal conditions, which is crucial for the desired transformation or fermentation to take place effectively.

Drava

Jala/ Steam/ Taila

Many therapeutic modalities, such as Svedana with Dola Yantra, Svedan Yantra, etc. Nirvapana, Dhalana, and Avapa Karma, use liquids as heating materials to produce specific therapeutic outcomes. These techniques enhance the body's ability to detoxify, relax, and rejuvenate, aligning with holistic principles.

E.g.–

Abharaka Shodhana

Dhatu Samanya Shodhana

Parada Sarana Samskara

Indirect Heating

Dhanya Rashi:

Preparation of Loha Bhasma with the help of Dhanya Rashi Method as mention in R.R.S.5/131-135:

शुद्धं सूतं द्विधा गन्धं खल्वेन कृतकज्जलम्।
द्वयोः समं लौहचूर्णं मर्दयेत्कन्यकादृवैः।।
यामद्वयात्समुद्धृत्य तद्गोलं कांस्यपात्रके।
आच्छाद्यैरण्डपत्रैश्च यामार्धेऽत्युष्णातां व्रजेत्।।
धान्यराशौ न्यसेत्पश्चात्त्रिदिनान्ते समुद्धरेत्।
सम्पेष्य गालयेद्वस्त्रे सत्यं वारितरं भवेत्।।
कान्तं तीक्ष्णं च मुण्डं च निरुत्थं जायते मृतम्।
स्वर्णादीन्मारयेदेवं चूर्णं कृत्वा च लौहवत्।।
सिद्धयोगो ह्ययं रव्यातः सिद्धानां सुमुखागतः।।
अनुभूतं मया सत्यं सर्वरोगजरापहम्।
त्रिफलामधुसंयुक्तं सर्वरोगेषु योजयेत्।। (R.R.S. 5/131-135)

1. **Preparation of Kajjali**:
   - Combine purified Parada (Mercury) and separate Gandhaka (Sulfur), of them in a ratio 1:2.
   - Grind the above mixture into fine, homogeneous black Kajjali.
2. **Combining with Loha**:
   - Mix equal amount of powdered Loha in Kajjali.
   - Rub the mixture with juice of Kumari for two praharas to make a ball.
3. **Heating Process**:
   - Seal the ball in a leaf of Eranda (Castor plant).
   - Cast it in a bronze pot;
   - Clean the vessel and expose it to intense sunlight for half a prahara or keep on fire.
4. **Dhanya Rashi Technique**:
   - Set the vessel with ball in a grain dust (Dhanya Rashi), until then after warming.
   - Keep it in the ground for 3 days around. To achieve this, a strictly regulated fermentative heating environment is necessary.
5. **Final Processing**:
   - 3rd Day: Remove the ball from your grain.
   - Rub it finely and sieve through cloth where upper stone is rubbed on this to get Varitara Bhasma. Smudge of disturbance over the water denote its quality also lightness.

6. **Conversion to Niruttha Bhasma:**
   - This process converts all three types of Loha (Svarna Loha, Rajata Loha and Tamra loha) into Niruttha Bhasma.
   - The technique is called Siddha Yoga, because it comes from the knowledge of the Siddhas (enlightened beings), who have directly experienced and confirmed this.
7. **Therapeutic Benefits:**
   - The method of preparation is used to prepare Loha Bhasma which can treat all disease and prevents aging.
   - It is administered with Triphala (which consists of Amalaki, Bibhitaki, and Haritaki) and honey for boosting its benefits in optimal levels.

Bhugarbha Sthapana:

Bhugarbha Sthapana is an traditional heating system used in the Ayurvedic alchemical processes, especially during Shodhana Samskara (purification procedures)

Process

1. A hole is dug in the ground, usually it has one yard of depth.
2. The pit: In this square, Parada (Hg) and menstruation a vessel placed inside for purification purposes.

Installation

1. The pot sits nestled in the pit so that it will stay put, and to allow for an even natural earth warming.
2. Once the meat is placed in its underground oven, it goes for hours through slow cooking ensuring even a distribution of heat with a rich caramelized bark.

Duration

The boat sits in the hole for 3 days. The earth acts as a natural insulator and heating is uniform because some animals agitated, while the land was warm.

Purpose

The process of Bhugarbha Sthapana is done primarily to clean or separate other non-reactive impurities /shadatva (imperfections which impart undesirable properties) out from Parada, thus making it highly potent as needed for medicinal and Alchemical purposes.

Benefits

1. These heat is gentle and sustains, which are needed to gently cleanse mercury.
2. It uses time-hallowed natural geothermal energy, is a sustainable and green way in traditional alchemy.

Multiple Choice Questions

1. **What does the term 'Puta' in Rasa literature primarily refer to?**
   a. A purification method involving washing
   b. A heating method for producing Bhasma
   c. A technique for grinding metals into powder
   d. A method of mixing herbs for therapeutic use
2. **Who is credited with introducing the concept of Puta and Marana in Rasa literature?**
   a. Vagbhatt Acharya
   b. Acharya Yashodhara Bhatt
   c. Nagarjuna d. Charaka
3. **In the context of the Marana process, what is the main function of Putapaka?**
   a. Enhancing the color of the substance
   b. Increasing the size of the metal particles
   c. Converting metals and minerals into Bhasma
   d. Combining different herbs for potency
4. **According to Rasa Ratna Samuchchaya, how should the type of Puta be determined?**
   a. Based on the size of the container
   b. By the strength (bala) or weakness (abala) of the substance
   c. Depending on the color of the metal
   d. By the flavor of the substance
5. **What is meant by the term "Sharav" in the context of Puta?**
   a. A type of herbal paste used in Ayurveda
   b. A specific weight, approximately 320 grams
   c. The name of a metal processing method
   d. A container used for storing herbs

6. **Which of the following is NOT a type of Puta based on the source of heat?**
   a. Surya Puta b. Chandra Puta
   c. Agni Puta d. Varaha Puta
7. **Which type of fuel is associated with Tusha Puta?**
   a. Cow dung cakes b. Wheat husk
   c. Wood chips d. Charcoal
8. **What does "Upala" refer to in the context of Puta?**
   a. Stones b. Cow dung cakes
   c. Leaves d. Sand
9. **Which type of Puta is associated with "Mridu Agni"?**
   a. Gaja Puta b. Varaha Puta
   c. Kapota Puta d. Maha Puta
10. **What is the primary purpose of ensuring the correct temperature in the Puta process?**
    a. To make the material more colorful
    b. To prevent the material from melting
    c. To enhance the medicinal potency and safety of the material
    d. To increase the mass of the metal
11. **What is the primary characteristic of Chandra Puta?**
    a. Intense heating of substances
    b. Cooling effect derived from moon rays
    c. Fast drying in sunlight
    d. Using high temperatures for incineration
12. **What makes Chandra Puta unique compared to other Puta methods?**
    a. High-temperature heating with fire
    b. Exposure to moon rays for cooling
    c. Rapid drying in the sun
    d. Using cow dung cakes for intense heat
13. **Which of the following Ayurvedic formulations is prepared using Chandra Puta?**
    a. Pravala Pishti b. Abhraka Bhasma
    c. Tamra Bhasma
    d. Surya Paaki Kutaja Taila
14. **What is the primary source of heat in Surya Puta?**
    a. Moonlight b. Fire
    c. Solar radiation d. Hot water
15. **What is the purpose of using Surya Puta in Ayurvedic medicine preparation?**
    a. To boil ingredients at high temperatures
    b. To gently warm and dry ingredients while preserving their potency
    c. To incinerate metals at very high temperatures
    d. To cool substances by moon rays
16. **Which Puta method involves creating a square pit with dimensions of 2 hastas (91 cm) filled with cow dung cakes?**
    a. Chandra Puta b. Surya Puta
    c. Gaja Puta d. Maha Puta
17. **What is the typical temperature range generated by the Maha Puta method?**
    a. 100°C to 200°C b. 300°C to 500°C
    c. 800°C to 1000°C d. 1000°C to 1200°C
18. **Which substances are typically incinerated using the Maha Puta method?**
    a. Herbs like Kutaja
    b. Soft metals like Gold
    c. Hard substances like Abhraka (mica) and Vaikranta d. Fresh fruits
19. **What is the heat quantum range typically associated with the Gaja Puta method?**
    a. 100°C to 300°C b. 500°C to 700°C
    c. 800°C to 1000°C d. 1200°C to 1500°C
20. **What materials are usually processed using the Gaja Puta method?**
    a. Herbs and plant roots
    b. Mica (Abhraka), Iron (Loha), and Copper (Tamra)
    c. Fresh flowers d. Seeds and grains
21. **Which Puta involves the use of a square pit measuring 1 Aratni (22 Angulas or 42.9 cm) in length, breadth, and depth, filled with cow dung cakes?**
    a. Kukkuta Puta b. Varaha Puta
    c. Kapota Puta d. Lavaka Puta
22. **What is the typical quantum of heat generated in Varaha Puta?**
    a. 200°C to 400°C b. 400°C to 600°C
    c. 600°C to 800°C d. 800°C to 1000°C
23. **Which Puta is specifically used for the marana (incineration) of mridu dravyas (soft substances) like Svarna (gold) and Rajata (silver)?**
    a. Kapota Puta b. Kukkuta Puta
    c. Varaha Puta d. Lavaka Puta
24. **Kapota Puta is also known by which of the following alternative names?**
    a. Mridu Puta b. Laghu Puta
    c. Svalpa Puta
25. **Which Puta uses Tusha (husk) or Govara (cow dung) as the heat source, providing mild heat suitable for processing soft or delicate substances?**
    a. Gorvara Puta b. Lavaka Puta
    c. Baluka Puta d. Kumbha Puta

26. What is the primary use of Bhanda Puta in Ayurvedic medicine preparation?
a. Preparation of Parada Bhasma
b. Marana of Haratala and Somala
c. Gandhaka Jarana
d. Incineration of Svarna and Rajata

27. Which Puta method involves burying the Musha (crucible) underground at a depth of two Angulas with cow dung cakes burned directly over it?
a. Varaha Puta b. Budhara Puta
c. Kapota Puta d. Kukkuta Puta

28. What is the quantum of heat typically generated in Kapota Puta?
a. 100°C to 200°C b. **200°C to 400°C**
c. 400°C to 600°C d. 600°C to 800°C

29. In which Puta is the Musha (crucible) heated using hot sand, either directly or by using an external heating source?
a. Gorvara Puta b. Baluka Puta
c. Bhanda Puta d. Lavaka Puta

30. What is the specific use of Gorvara Puta in Ayurvedic practices?
a. Preparation of Lavana (salts)
b. Preparation of Rasa Bhasma
c. Gandhaka Jarana d. Marana of Kaparda

31. When the type of Puta for a particular material is not specified, which Puta is recommended to be used first?
a. Kapota Puta b. Gorvara Puta
c. Gajaputa d. Kukkuta Puta

32. What is the recommended second Puta to be applied when the first Puta is Govar Puta?
a. Kapota Puta b. Varaha Puta
c. Kukkuta Puta d. Lavaka Puta

33. What is the rationale behind using the Puta process in Ayurveda?
a. To increase the earthly (heavy) qualities of metals
b. To reduce the earthly (heavy) qualities and increase ethereal (light) qualities of the metal
c. To convert metals into liquid form
d. To decrease the medicinal properties of the metals

34. Which Puta is specifically recommended for the reduction of Tikshna Loha (steel)?
a. Bhanda Puta b. Gajaputa
c. Kapota Puta d. Varaha Puta

35. What is the primary benefit of the ash produced from the incineration process in Ayurveda?
a. It is easier to expel from the body
b. It stays longer in the digestive organs, allowing fine particles to be maximally absorbed into the bloodstream
c. It decreases the substance's therapeutic potential
d. It increases the weight of the substance

36. What is the primary purpose of a Musha in Rasa Shastra?
a. To store herbs
b. To perform purification and processing of Ras Dravya (mineral compounds)
c. To measure ingredients
d. To grind minerals

37. Which of the following is NOT a synonym of Musha?
a. Karunchika b. Karahatika
c. Panchakarma d. Pachini

38. Which type of Musha is known for its high heat tolerance and is often referred to as a "friend of fire"?
a. Kumudi b. Karunchika
c. Vahnimitra d. Karahatika

39. What is the primary ingredient used in the preparation of a "Samanya Musha"?
a. Charcoal
b. Selected Mud (Mritika)
c. Gold
d. Sandalwood

40. Which type of Musha is specifically used for Parada Marana?
a. Vajra Musha b. Yoga Musha
c. Gostani Musha d. Maha Musha

41. What is "Musha Sandhi Bandhana" used for?
a. Heating Rasa Dravya
b. Sealing the crucible and its lid
c. Preparing herbal decoctions
d. Grinding minerals

42. Which type of Musha is oblong in shape and resembles a cow's udder?
a. Maha Musha b. Pakva Musha
c. Yoga Musha d. Gostani Musha

43. What is the boiling temperature of liquid sulfur used in the preparation of Pottali Rasayanas?
a. 100°C b. 444.5°C
c. 500°C d. 350°C

44. Which Musha is also known as "Sthula Musha"?
a. Maha Musha b. Samanya Musha
c. Yoga Musha d. Gostani Musha

45. What is "Musha Payana" in the context of Rasa Shastra?
a. The process of applying a lid to a crucible
b. The act of removing a red-hot crucible from the fire briefly
c. The preparation of herbal medicines
d. The melting of metals

46. What is the primary purpose of a crucible?
a. Cooling metals
b. Melting and calcining substances at high temperatures
c. Filtering chemical compounds
d. Storing laboratory chemicals

47. Which crucible material has the highest temperature tolerance?
a. Nickel crucibles
b. Vitreous carbon crucibles
c. Porcelain crucibles d. Zirconium crucibles

48. What is the main ingredient in silica crucibles?
a. Aluminum silicate b. Sodium silicate
c. Silicon dioxide (SiO_2) d. Calcium silicate

49. Which type of mudra uses 'Udumbara ksira' and 'Vata ksira' as ingredients?
a. Hatha Mudra b. Madana Mudra
c. Jala Mudra d. Agni Mudra

50. In modern crucible manufacturing, what is the primary purpose of adding borax powder to kaolin?
a. To increase temperature tolerance
b. To enhance surface properties
c. To make the crucible lighter
d. To reduce melting point

51. Which crucible material is mainly used in gravimetric chemical analysis?
a. Platinum crucibles b. Silica crucibles
c. Porcelain crucibles d. Nickel crucibles

52. What is the unique feature of Hatha Mudra's preparation method?
a. It requires heating the ingredients
b. It is prepared only during the daytime
c. It involves mixing magnetic iron powder with pig's blood
d. It uses kaolin clay

53. Which crucible type is typically made from silica or China clay?
a. Vitreous carbon crucibles
b. Platinum crucibles
c. Modern crucibles
d. Nickel crucibles

54. What is the purpose of using 'Madana Mudra' during parada jarana?
a. To increase the temperature of the crucible
b. To prevent the evaporation of mercury
c. To seal the crucible and its lid
d. To add magnetic properties to the mixture

55. Which material is crucial for modern crucibles due to its high heat-resistant properties?
a. Fire clay b. Borax powder
c. Calcium silicate d. Pig's blood

56. What is the primary material traditionally used to construct a chulhika?
a. Cement b. Metal
c. Bricks or soft clay d. Wood

57. Which functional component of a chulhika is used to place live coals for effective heating?
a. Lower Outlet b. Upper Outlet
c. Middle Outlet d. Side Outlet

58. Which of the following is NOT a synonym for 'chulhika'?
a. Angaradhanika b. Hasantika
c. Angarsakati d. Gara Koshthi

59. What is the primary purpose of a 'Patala Koshthi'?
a. Melting metals
b. Extracting sattva and purifying soft drugs
c. Heating water d. Cooking food

60. Which type of koshthi is specifically designed for melting and purifying metals like gold, silver, and copper?
a. Angar Koshthi b. Patala Koshthi
c. Gara Koshthi d. Chullika

61. What is the primary function of the gas pressure regulator in a gas stove?
a. To ignite the gas
b. To control the flame size
c. To ensure safe and consistent gas pressure
d. To prevent gas leaks

62. Which of the following is a disadvantage of using a gas stove?
a. Precise temperature control
b. Instant heat availability
c. Risk of gas leaks
d. Compatibility with all cookware

63. **What is the main principle behind the working of a hot plate?**
   a. Electromagnetic induction
   b. Electrical resistance heating
   c. Combustion of gas
   d. Radiation heating

64. **Which component of the hot plate ensures even heat distribution across its surface?**
   a. Heating element b. Insulation
   c. Top plate d. Temperature control

65. **Which of the following is a key advantage of using a heating mantle?**
   a. Limited temperature range
   b. Uniform heating around the container
   c. High energy consumption
   d. Fragility

66. **What material is typically used for the heating element in a heating mantle?**
   a. Copper wire b. Nichrome wire
   c. Aluminum plate d. Stainless steel

67. **Which law governs the principle of an induction stove?**
   a. Ohm's Law b. Faraday's Law
   c. Lenz's Law d. Boyle's Law

68. **What is a significant disadvantage of using an induction stove?**
   a. High efficiency b. Longevity
   c. Limited range of power transfer
   d. Precise temperature control

69. **In a muffle furnace, what is the purpose of the refractory material?**
   a. To generate heat
   b. To insulate and distribute heat evenly
   c. To cool the furnace
   d. To ignite the furnace

70. **Which of the following is an application of a muffle furnace?**
   a. Wireless charging
   b. Heat treatment of metals
   c. Cooking
   d. Sterilization of glassware

Answer Sheet

1.	B.	2.	C.	3.	C.	4.	B.	5.	B.	6.	D.	7.	B.	8.	D.
9.	C.	10.	C.	11.	B.	12.	B.	13.	A.	14.	C.	15.	B.	16.	D.
17.	D.	18.	C.	19.	C.	20.	B.	21.	B.	22.	C.	23.	B.	24.	D.
25.	B.	26.	B.	27.	B.	28.	B.	29.	B.	30.	B.	31.	B.	32.	C.
33.	B.	34.	B.	35.	B.	36.	B.	37.	C.	38.	C.	39.	B.	40.	B.
41.	B.	42.	D.	43.	B.	44.	A.	45.	B.	46.	B.	47.	B.	48.	C.
49.	B.	50.	B.	51.	B.	52.	C.	53.	C.	54.	C.	55.	A.	56.	C.
57.	C.	58.	D.	59.	B.	60.	C.	61.	C.	62.	C.	63.	B.	64.	C.
65.	B.	66.	B.	67.	B.	68.	C.	69.	B.	70.	B.				

Short Question Answer

1. Write short note on Budhar Puta
2. Crucibles
3. Koshthi
4. Heating Mantle
5. Muffle Furnace.
6. Note on Chullika.

Long Question Answer

1. Detailed explanation of puta prakarana with its types, utility and quantum of heat.
2. Describe Musha and its types in detail.

• • •

6 Kalpana Nirmana - I

• Lecture: 6 hours, non-lecture: 4 • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- Yes) •

Kalpana

कल्पः विधि विधाने संस्कारे।
कल्पे विधि क्रमौ। (Amar.K.)

Kalpana refers to the method or process used to prepare medicines, whether from a single drug or a combination of multiple drugs. The raw form of a drug is typically unsuitable for direct therapeutic use; it must be transformed through specific processes to make it effective and safe for medicinal purposes.

Types of Kalpana

1. **Aushadha Kalpana**: This involves the preparation of medicinal formulations:
   - Primary Preparation: eg.- Panchavidha Kashaya Kalpana.
   - Secondary Preparation: eg. - Avaleha Kalpana, Sneha Kalpana.
2. **Aahara Kalpana**: This pertains to the preparation of Pathya Kalpana (Manda, Paya, Yavangu, etc.) dietary formulations.

Panchavidha Kashaya Kalpana (Primary dosage forms)

Intoduction

Kashaya Kalpanas are medicinal formulations that are designed to alleviate or eliminate disease conditions from the body. Different scholars have categorized and enumerated these Kalpanas in varying ways, leading to differences in the number of Kashaya Kalpanas recognized across classical texts.

a. Panchavidha Kashaya Kalpana

पञ्चविधं कषायकल्पनमिति तद्यथा–स्वरसः, कल्कः, शृतः, शीतः, फाण्टः, कषाय इति।। (Ch.Su. 4/6)

1. Svarasa
2. Kalka
3. Shrita
4. Shita
5. Phanta

पञ्चविधस्तु भेषजानां कषायकल्पः।
निर्यासः कल्को निर्यूहः शीतः फाण्टश्च। ते यथापूर्वं बलिनः। (As.S.K. 8/9)

1. Niryasa
2. Kalka
3. Niryuha
4. Shita
5. Phanta

कषाययोनयः पञ्चरसा लवणवर्जिताः।
रसः कल्कः शृतः शीतः फाण्टश्चेति प्रकल्पना।।
पञ्चधैवं कषायाणां पूर्वं पूर्वं बलाधिका। (A.Hr.K. 6/9)

1. Rasa
2. Kalka
3. Shrita
4. Shita
5. Phanta

स्वरसः कल्कः क्वाथश्च हिमफाण्टकौ।
ज्ञेयाः कषायाः पञ्चैते लघवः स्युर्यथोत्तरम्।। (Sha.S.M.Kh. 1/1)

1. Svarasa
2. Kalka
3. Kvatha
4. Hima
5. Phanta

द्रव्यकल्पः पञ्चधा स्यात् कल्कश्चूर्णं रसं तथा।
तैलमर्कं क्रमाज्ज्ञेयं यथोत्तरगुणं प्रिये।। (Ak.Pra. 1/46)

1. Kalka
2. Churna
3. Rasa
4. Taila
5. Arka

b. Shadavidha Kashya Kalpana

क्षीरं रसः कल्कमथो कषायः शृतश्च शीतश्च तथैव चूर्णम्।
कल्पाः षडेते खलु भेषजानां यथोत्तरं ते लघवः प्रदिष्टाः।।
(Su.Su. 44/91)

1. Kshira
2. Rasa
3. Kalka
4. Shrita Kashaya
5. Shita
6. Churna / Phanta

c. Saptavidha Kashaya Kalpana

चूर्णं शीतकषायश्च स्वरसोऽभिषवस्तथा।
फाण्टः कल्कस्तथा क्वाथो यथावत्तं निबोध मे।।
(Ka.S.Khi. 3/35)

1. Churna
2. Shita
3. Svarasa
4. Abhisava
5. Phanta
6. Kalka
7. Kvatha

1. Svarasa

Introduction

Svarasa, the first and most fundamental of the Panchavidha Kashaya Kalpana, holds a significant place in pharmaceutics. According to the Sharngadhara Samhita, Svarasa is considered to be more guru (heavy) compared to other forms of preparation, reflecting its potency and therapeutic strength. It is the fresh juice extracted directly from medicinal plants and herbs, making it highly effective due to its concentrated active ingredients. Svarasa is primarily used in acute conditions where immediate therapeutic action is required, providing quick absorption and fast-acting results.

Definition

यन्त्रनिर्पीडितात् द्रव्यात् रसः स्वरस उच्यते। (Ch.Su. 4/7)

Svarasa is the juice extracted mechanically from a plant, commonly using herbs that are rich in Jaliyamsha (aqueous content) and Parthivamsha (earthy elements). This method yields a concentrated herbal preparation ideal for therapeutic purposes.

स्वरसः इति सद्योरसः। (Shabdakalpadrum)

Svarasa is the freshly extracted juice of a plant or a specific plant part.

अहतात्क्षणकृष्टाद् द्रव्यात्क्षणात् समुद्धरेत्।
यन्त्रनिर्पीडितो यः स रसः स्वरस उच्यते।।
(Sha.S.M.Kh. 1/2)

The juice obtained by pounding fresh green plants and then squeezing them through a cloth is called Svarasa.

Synonyms

Rasa, Niryasa, Svarasa

Principle

1. **Kuttana (Crushing)**: The herbal dravya are finely crushed to break down the plant material, allowing the active components to be released.
2. **Nishpidana (Squeezing)**: After crushing, the plant material is pressed to obtain the juice, maximizing extraction of its beneficial properties.

General Method of Preparation

1. Select fresh, healthy medicinal plants free from contaminants, pests, or diseases.
2. Clean the plant material thoroughly to remove soil, dust, and impurities.
3. Cut or crush the plant material using tools like a mortar and pestle (Khalva Yantra) or crushers.
4. Compress the material to extract the juice using a juicer, press, or manual wringing.
5. Filter the juice if needed to remove solids and fibers, using fine cloth or a sieve.
6. Collect it.

Rules

1. For Dry Drugs:

कुडवं चूर्णितं द्रव्यं क्षिप्तं च द्विगुणे जले।
अहोरात्रं स्थितं तस्माद् भवेद् वा रस उत्तमः।।
(Sha.S.M.Kh. 1/3)

Procedure

1. Take 192 grams of coarse powder of the drug and soak it overnight in twice its volume of water.
2. The next morning, thoroughly mix and macerate the soaked powder.
3. Strain the mixture through a cloth to obtain the liquid extract.

2. For Very Hard Drugs:

आदाय शुष्कं द्रव्यं वा स्वरसानामसम्भवे।
जलेऽष्टगुणिते साध्यं पादशिष्टं च गृह्यते।। (Sha.S.M.Kh. 1/4)

Procedure

1. Add 8 times the volume of water to one part of the coarse powder of the drug.
2. Boil the mixture on a mild to moderate flame.

3. Continue boiling until the volume is reduced to one-fourth of the original amount.

3. For Tender Drugs:

पुटपाकस्य कल्कस्य स्वरसो गृह्यते यतः।
अतस्तु पुटपाकानां युक्तिरत्रोच्यते मया।।
पुटपाकस्य मात्रेयं लेपस्याङ्गारवर्णता।
लेपं च द्व्यङ्गुलं स्थूलं कुर्याद् वाङ्गुष्ठमात्रकम्।।
काश्मरीवटजम्ब्वादिपत्रैर्वेष्टनमुत्तमम्।
पलमात्रं रसो ग्राह्यः कर्षमात्रं मधु क्षिपेत्।।
कल्कचूर्णद्रवाद्यास्तु देयाः स्वरसवद् बुधैः।
(Sha.S.M.Kh. 1/25-27)

Procedure

1. Make the Kalka (paste) of the specific drug.
2. Wrap the Kalka in larger non-poisonous leaves (e.g., palasha, vata, gambhari, jambu) and secure it with cotton thread.
3. Coat the wrapped kalka with a layer of mud about 3/4 inch thick.
4. Dry the mud-coated kalka in the shade, then bake it over burning charcoal until it becomes red-hot.
5. Remove the kalka from the fire and let it cool. While it is still warm, remove the layers and strain the Kalka through a clean cloth to obtain the putapaka svarasa.
6. Administer the putapaka svarasa in a dosage of one pala (approximately 48 grams) along with 6 grams of madhu (honey) or combine it with appropriate kalka, churna (powder), or drava (liquid).

Prakshepa Dravya

मधु श्वेता गुडं क्षाराङ्गीरकं लवणं तथा।
घृतं तैलं च चूर्णादीन् कोलमात्रान् रसे क्षिपेत्।।
(Sha.S.M.Kh. 1/6)

Mix the following ingredients in one kola:

- Honey
- Sita (a type of sugar or sweet substance)
- Guda (jaggery)
- Kshara (alkaline substance)
- Jiraka (cumin)
- Lavana (salt)
- Ghrita (clarified butter)
- Taila (oil)
- Various churna (powdered herbs)

The total weight should be 6 grams.

Instruments

For Small-Scale Production:

- A Juicer grinder is commonly used to extract juice efficiently while preserving the herbal integrity.

For Large-Scale Production:

- Mechanical or Automated Juice Extractors are used to process larger volumes of herbs, ensuring greater output and consistency.
- Siddhi Lakshana (Indicators of Proper Svarasa).
- The extracted juice should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Storage

- Ideally, Svarasa – Instant Use.
- However, Svarasa are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in cans or glass bottles while preserving their efficacy.

Dose

स्वरसस्य गुरुत्वाच्च पलमर्धं प्रयोजयेत्।
निशोषितं चाग्निसिद्धं पलमात्रं रसं पिबेत्।।
(Sha.S.M.Kh. 1/5)

Niragnisiddha Svarasa- Half Pala (24gms)
Sagnisiddha Svarasa- One Pala (48gms)

Shelf Life

1. Sadhyosevana- Instant Use
2. According to Yogaratnakara jvara chikitsa- 3 hours

Modren Aspect

- In modern pharmaceutical science, the term "expressed juice" refers to the liquid extracted from solid materials through a mechanical process that applies force.
- This technique is commonly used to obtain juices from plants and fruits, as well as oils from seeds, nuts, and other oil-rich substances.
- The process involves pressing or squeezing the material to separate the liquid component from the solid residue, resulting in a concentrated extract of the beneficial compounds present in the original material.

- This method is widely utilized in the preparation of herbal extracts, essential oils, and various pharmaceutical preparations to harness the active ingredients efficiently.

Principle

1. **Mechanical Force**: Pressure or squeezing is applied to break the plant cells, releasing the juice that contains water-soluble nutrients, bioactive compounds, and essential phytochemicals.
2. **Separation of Liquids from Solids**: The goal of expression is to separate the liquid components, including active compounds, from the fibrous or solid parts of the plant. The more aqueous parts (Jaliyamsha) are targeted for extraction.
3. **Retention of Potency**: By avoiding excessive heat or chemical processing, the method preserves volatile and thermolabile compounds, ensuring the extracted juice remains potent and therapeutically effective.

Example

1. Adaraka Svarasa

References

आर्द्रकस्वरसः क्षौद्रयुक्तो वृषणवातनुत्।
श्वासकासारुचीर्हन्ति प्रतिश्यायं व्यपोहति।। (Sha.S.M.Kh. 1/13)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Adraka	Q.S.

Procedure

1. Take the desired quantity of freshly collected Adraka (Zingiber officinale) and wash it thoroughly to remove any dirt or impurities.
2. Wipe the ginger clean with a dry cloth to remove excess moisture.
3. Place the cleaned ginger into a Khalva Yantra (traditional mortar and pestle).
4. Pound the ginger into a fine paste, ensuring that the plant fibers are thoroughly broken down.
5. Transfer the paste into a clean cotton cloth.
6. Squeeze the paste tightly, allowing the juice to filter through the cloth into a clean vessel.
7. The filtered juice collected in the vessel is the Adraka Svarasa (fresh ginger juice), ready for immediate use.

Dose: 24 ml

Anupana: Honey

Therapeutic Indication: Vrishanavata, Shvasa, Kasa, Aruchi and Pratishyaya.

2. Vasa Putapaka Svarasa

Reference

पिष्टानां वृषपत्राणां पुटपाकरसो हिमः।
मधुयुक्तो जयेद्रक्तपित्तकासज्वरक्षयान्।। (Sha.S.M.Kh. 1/16)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Vasa Patra	Q.S.

Procedure

1. Make the kalka (paste) of the Vasa Patra.
2. Wrap the kalka in palasha leaves and secure it with cotton thread.
3. Coat the wrapped kalka with a layer of mud about 3/4 inch thick.
4. Dry the mud-coated kalka in the shade, then bake it over burning charcoal until it becomes red-hot.
5. Remove the kalka from the fire and let it cool. While it is still warm, remove the layers and strain the kalka through a clean cloth to obtain the putapaka svarasa.

Dose: 48 ml

Anupana: Honey

Indication: Raktapitta, Kasa, Shvasa, Vishamajvara and Kshaya.

2. Kalka

Introduction

- Kalka is considered as 2nd more potent Kalpana among Panchavidha Kashaya Kalpana due to its being a pure herbal extract.
- Since Kalka involves minimal physical processing, the chemical constituents remain in their natural, unaltered form, which helps preserve the integrity of the active ingredients.
- Kalka retains a wide range of medicinal properties and pharmacological actions, as recorded in various databases on raw herbal drugs.
- Kalka is versatile in its application, used both internally and externally, and often combined with other treatments.

- Partivamsha pradhana (earth-element dominant) herbs are commonly preferred for preparing Kalka.

Definition

द्रव्यमार्द्रं शिलापिष्टं शुष्कं वा सजलं भवेत्।
प्रक्षेपावापकल्कास्ते तन्मानं कर्षसम्मितम्।। (Sha.S.M.Kh. 5/1)

The soft mass obtained by pounding the herbal material in a clean Khalva Yantra is known as Kalka.

NOTE: For dry drugs, the fine powder of the herb is mixed with the required amount of water and then triturated until a smooth, homogenous paste is formed.

Synonyms

Prakshepa, Avapa, Kalka, Pinda.

Principle

1. **Kuttana (Crushing)**: The herbal dravya are finely crushed to break down the plant material, allowing the active components to be released.
2. **Peshana**: Refers to the grinding of the crushed dravya into a smooth paste. It making more homogeneous and easier to absorb or apply.

General Method of Preparation

- Choose the desired herbal drug and wash it thoroughly to remove any dirt or impurities.
- After washing, wipe the drug with a clean, dry cloth to eliminate excess moisture.
- Place the cleaned herbal material into a Khalva Yantra.
- Grind the material well until it forms a smooth, soft paste, ensuring that all fibrous parts are completely broken down or removed.
- The resulting fine, fiber-free paste is ready for use in therapeutic applications.

Prakshepa Dravya

कल्के मधु घृतं तैलं देयं द्विगुणमात्रया।
सितागुडं समी दद्याद् द्रवा देयाश्चतुर्गुणाः।। (Sha.S.M.Kh.5/2)

1. Madhu, Ghrita, Taila- 2 Times of Kalka
2. Sita, Guda – Equal Proportion to Kalka
3. Drava Dravya – 4 Times of Kalka

Instruments

For Small-Scale Production:

- Kalva Yantra (Mortor and Pestle)

For Large-Scale Production:

- Mechanical or Automated Machine are used to process larger volumes of pastes, ensuring greater output and consistency.

Siddhi lakshana

The kalka should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Storage

- Ideally, Kalka – Instant Use.
- However, Kalka are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in glass bottles while preserving their efficacy.

Dose

1 Karsha (12 gms)

Shelf Life

1. Sadhyosevana- Instant Use
2. According to Yogaratnakara jwara chikitsa- 3 hours.

Modern Aspect

In modern formulations, Herbal pastes, poultices, or ointments terms used and herbal drugs are often combined with carriers like oils, waxes, or gels to create ointments or pastes that can be applied topically. The therapeutic efficacy in both cases is linked to the direct application of active plant ingredients on the skin or consumed internally for medicinal benefits.

Example

Haridra Kalka can be compared to a modern Turmeric-based ointment or cream used for inflammation or skin conditions. Both forms aim to utilize the anti-inflammatory properties of turmeric (curcumin) for healing purposes.

Examples

1. Nimba Kalka

References

लेपान्निम्बदलैः कल्को व्रणशोधनरोपणः।।
भक्षणाच्छर्दिकुष्ठानि पित्तश्लेष्मकृमीञ्जयेत्। (Sha.S.M.Kh. 5/5-6)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Nimba Patra	Q.S.

Procedure

- Collect the Nimba Patra and wash it thoroughly to remove any dirt or impurities.
- After washing, wipe the drug with a clean, dry cloth to eliminate excess moisture.
- Place the cleaned herbal material into a Khalva Yantra.
- Grind the material well until it forms a smooth, soft paste, ensuring that all fibrous parts are completely broken down or removed.
- The resulting fine, fiber-free paste is ready for use in therapeutic applications.

Dose: 12 gm

Anupana: Honey, Sita, Guda

Indications

- Internally- Chhardi, Kushtha, Pittaja and Shleshmaja Krimi
- Externally- Varna Shodhana, Varna Ropana.

2. Rasona Kalka

References

शुद्धः कल्को रसोनस्य तिलतैलेन मिश्रितः।
वातरोगाञ्जयेत्तीव्रान्विषमज्वरनाशनः।। (Sha.S.M.Kh. 5/7)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Nishtusha Rasona	Q.S.

Procedure

- Select the required quantity of well-grown Rasona) and remove their outer covering.
- Soak the peeled garlic bulbs overnight in buttermilk.
- This process helps to reduce the tikshnata (pungency) of the garlic, purifying the herb and making it suitable for therapeutic use.
- The next day, collect the soaked garlic bulbs and place them in a clean Khalva Yantra (mortar and pestle).
- Pound the garlic bulbs into a smooth, fine paste.
- The fine garlic paste, now known as Rasona Kalka, is ready for therapeutic use.

Dose: 12 gms with Double quantity of Tila Taila.

Indications: Vataja Roga, Vishama Jvara.

3. Kvatha

Introduction

Kvatha is one of the most prominent and widely utilized forms among the five basic Ayurvedic preparations, both therapeutically and pharmaceutically.

Although detailed descriptions are not found in Vedic literature, comprehensive guidelines for its preparation, including water ratios and volume reduction, are thoroughly documented in various Samhitas.

In the 13th century, Acharya Sharngadhara compiled an extensive collection of pharmaceutical preparations from the Samhitas and other texts, consolidating this knowledge in the Madhyama Khanda of his work, the Sharngadhara Samhita.

The second chapter of Madhyama Khanda specifically addresses the preparation of Kvatha Kalpana.

The term Kvatha is derived from Kvathana, which means boiling, reflecting the key process involved in its preparation.

Definition

वह्नौ तु क्वथितं द्रव्यं श्रृतमाहुश्चिकित्सकाः। (Ch.Su. 4/7)

Kvatha is a filtered decoction obtained by boiling herbal substances in water.

Synonyms

श्रृतः क्वाथः कषायश्च निर्यूहः स निगद्यते।
(Sha.S.M.Kh. 2/2)

Shrita, Kvatha, Kashaya, Niryuha, Kadha.

Principle

Jala- Agni Sannikarsha

General Method of Preparation

पानीयं षोडशगुणं क्षुण्णे द्रव्यपले क्षिपेत्।
मृत्पात्रे क्वाथयेद् ग्राह्यमष्टमांशावशेषितम्।।
तज्जलं पाययेद् धीमान् कोष्णं मृद्वग्निसाधितम्।
(Sha.S.M.Kh. 2/1-2)

- Take the selected herbal substance, ground into a coarse powder.

- Combine one part of the coarse powder with 16 parts of water in a suitable vessel.
- Boil the mixture until the volume is reduced to one-eighth of the original amount.
- Filter the reduced liquid to separate the solid residues.
- The resulting liquid filtrate is called Kvatha.

Precautions

अपिधानमुखे पात्रे जलं दुर्जरतां व्रजेत्।
तस्माद् आवरणं त्यक्त्वा क्वाथादींश्च विपाचयेत्।।
(Sha.S.M.Kh. 2/7)

1. Use a broad-mouthed vessel for boiling water.
2. Boil the water without a cover to allow for evaporation.
3. Reduce the liquid to one-eighth of its original volume.

Rules

चतुर्गुणं मृदुद्रव्ये कठिनेऽष्टगुणं जलम्।
तथा च मध्यमे द्रव्ये दद्यादष्टगुणं पयः।।
अत्यन्तकठिने द्रव्यं नीरं षोडशिकं मतम्।
(Sha.S.M.Kh. 9/3-4)

Drugs of Different Nature	Water Ratio	Reduction part
Soft drug	4 times water	1/4th
Medium and hard drugs	8 times water	1/4th
Very hard drugs	16 times water	1/4th

कर्षादितः पलं यावत् क्षिपेत् षोडशिकं जलम्।।
तदूर्ध्वं कुडवं यावद् भवेदष्टगुणं पयः।
प्रस्थादितः क्षिपेन्नीरं खारीं यावत् चतुर्गुणम्।।
(Sha.S.M.Kh. 9/4-5)

Drugs Quantity	Water Ratio
1 Karsha – 1 Pala	16 times water
1 Pala – 1 Kudava	8 times water
1 Kudava – 1 Prastha	4 times water

Prakshepa Dravya

क्वाथे क्षिपेत् सितामंशैश्चतुर्थांष्टमषोडशैः।
वातपित्तकफातङ्के विपरीतं मधुस्मृतम्।। (Sha.S.M.Kh. 2/4)

Dravya	Vataj Roga	Pittaja Roga	Kaphaj Roga
Sita	1/4th Part	1/8th Part	1/16th Part
Honey	1/16th Part	1/8th Part	1/4th Part

जीरकं गुग्गुलं क्षारं लवणं च शिलाजतु।
हिङ्गु त्रिकटुकं चैव क्वाथे शाणोन्मितं क्षिपेत्।।
क्षीरं घृतं गुडं तैलं मूत्रं चान्यद् द्रवं तथा।
कल्कं चूर्णादिकं क्वाथे निक्षिपेत् कर्षसम्मितम्।।
(Sha.S.M.Kh. 2/5-6)

Jiraka, Guggulu, Kshara, Lavana, Shilajita, Hingu, Trikatu = 3 gms to Kvatha quantity

Kshira, Ghrita, Taila, Mutra, Drava, Kalka, Churna = 12 gms to Kvatha quantity.

Instrument

- **For Small-Scale Production:** Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production:**
  - Decoction Boiler or Extraction Kettle
  - Automated Extraction Unit
  - Hydraulic Filter Press
  - Industrial Centrifuge
  - Rotary Vacuum Evaporator or Falling Film Evaporator
  - Agitated Mixing Tank

These machines and processes facilitate efficient large-scale production of Kvatha, ensuring quality and consistency.

Siddhilakshana

The kvatha should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Storage

- Ideally, Kvatha – Instant Use.
- However, Kvatha are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in glass bottles while preserving their efficacy.

Dose

आहाररसपाके च सञ्जाते द्विपलोन्मितम्।
वृद्धवैद्योपदेशेन पिबेत् क्वाथं सुपाचितम्।।
(Sha.S.M.Kh. 2/3)

96 ml (After Food)

Shelf Life

1. Sadhyosevana- Instant Use
2. According to Yogaratnakara jvara chikitsa – 3 hours
3. Kvatha Churna– 2 years (D&C rule- 2016)

4. Pravahi Kvatha with preservatives- 3 years (D&C rule- 2016)

Modern Aspect

Decoction is a process used to extract the water-soluble and heat-stable constituents from hard, woody crude drugs. This involves boiling the drug in water for a specified period, typically 10 to 15 minutes.

After boiling, the liquid is strained, and additional water is passed through the remaining drug material in the strainer to achieve the required volume.

Since different vessels and heat sources may lead to varying degrees of evaporation, it is essential to adjust the final volume to ensure consistency in the product.

Example

1. Punarnavastaka Kavtha

References:

पुनर्नवाभयानिम्बदार्वीत्तिक्तापटोलकैः।
गुडूचीनागरयुतैः क्वाथो गोमूत्रसंयुतः।
पाण्डुकासोदरश्वासशूल सर्वाङ्गशोथहा।।

(Sha.S.M.Kh. 2/76-77)

Ingredients

No.	Ingredient Name	Quantity
1.	Punarnava	1 part
2.	Abhaya	1 part
3.	Nimba	1 part
4.	Devadaru	1 part
5.	Katuki	1 part
6.	Patola	1 part
7.	Guduchi	1 part
8.	Sunthi	1 part
9.	Jala	16 parts

Procedure

- Collect all the ingredients of Punarnavastaka Kvatha and ground into a coarse powder.
- Combine one part of the coarse powder with 16 parts of water in a suitable vessel.
- Boil the mixture until the volume is reduced to one-eighth of the original amount.
- Filter the reduced liquid to separate the solid residues.
- The resulting liquid filtrate is called Kvatha

Dose: 48 ml

Anupana: Gomutra.

Indications: Udara Roga, Sarvanga Shotha, Kasa, Shvasa, Shula and Pandu roga.

4. Hima

Introduction

- Hima occupies the fourth position in Panchavidha Kashaya Kalpana.
- This technique is used because Shita virya or volatile herbs may lose their active components when heated or boiled.
- Hima Kalpana, therefore, involves a cold infusion process that preserves the active ingredients of these herbs.

Definition

यत् द्रव्यं द्रवे सकलां रात्रिं स्थितं स कल्पना कषायः शीत इत्युच्यते। (A.Hr.Su. 6/10 Arundatt)

The Dravya is immersed in a liquid (Drava) and left to steep overnight. The following day, the mixture is filtered, and the resulting liquid is known as Hima.

Synonyms

Shita Kashaya.

Principle

Jala Sannikarsha.

General Method of Preparation

क्षुण्णं द्रव्यपलं सम्यक् षड्भिर्नीरपलैः प्लुतम्।
निशोषितं हिमः स स्यात् तथा शीतकषायकः।।

(Sha.S.M.Kh. 4/1)

1. Take one part of the drug in its coarse powder form.
2. Soak the powder in six parts of soft, clean water. Allow it to steep overnight.
3. The next day, thoroughly macerate the mixture using clean hands to ensure the drug is well integrated with the water.
4. Filter the mixture through a clean cotton cloth to separate the liquid from the solid residue.
5. Collect the resulting liquid, which is referred to as 'Hima.'

Instrument

- **For Small-Scale Production**: Stain-steel Vessel, Glass beakers, Filter paper, Measuring tool, Stirring Rod.

- **For Large-Scale Production**:

1. Cold Extraction Units
2. Silverson high Shear Mixers
3. Homogenizers
4. Carrier Transicold Chillers.

Siddhi lakshana

The Hima should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Storage

- Ideally, Hima – Instant Use.
- However, Hima are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in glass bottles while preserving their efficacy.

Dose

96 ml

Shelf Life

Sadhyosevena - Instant Use.

Modern Aspect

Cold infusion is a method of extracting beneficial compounds from herbs or plant materials using a cold or room-temperature liquid. This technique is particularly valuable for preserving heat-sensitive components that may be degraded or lost through boiling or other heating processes.

Procedure

1. A specified amount of herbal substance is combined with a larger volume of clean, cold water.
2. The mixture is left to steep at room temperature for an extended period, typically overnight, allowing the active compounds to dissolve into the liquid.
3. The mixture is gently stirred or macerated to enhance extraction.
4. After steeping, the mixture is filtered to separate the liquid extract from the solid material.
5. Collect and store it.

Example

1. Dhanyaka Hima

Reference:

प्रातः सशर्करः पेयो हिमो धान्यकसम्भवः।।
अन्तर्दाहं तथा तृष्णां जयेत् स्रोतोविशोधनः।

(Sha.S.M.Kh. 4/7)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Dhanyaka	1 part
2.	Jala	6 parts

Procedure

1. Take one part of the drug in its coarse powder form.
2. Soak the powder in six parts of soft, clean water. Allow it to steep overnight.
3. The next day, thoroughly macerate the mixture using clean hands to ensure the drug is well integrated with the water.
4. Filter the mixture through a clean cotton cloth to separate the liquid from the solid residue.
5. Collect the resulting liquid, which is referred to as 'Hima.'

Dose: 96 ml

Anupana: Sita

Indications: Antardaha, Trishna

5. Phanta

Introduction

- Phanta Kalpana is one of the five fundamental pharmaceutical dosage forms, known as Panchavidha Kashaya Kalpanas.
- Among these, Phanta Kashaya is ranked fifth, and it is characterized by its mild potency and light nature, making it easier to digest compared to the more intense preparations like Kvatha and Kalka.
- This method of preparation involves hot infusion, which imparts a lighter quality to the resulting preparation.
- Phanta Kashaya is particularly suitable for herbs that are aromatic, easy to digest, and free from dense tissues.
- Its preparation is less restrictive compared to other Kashaya Kalpanas.

Definition

Phanta is a preparation made by pouring hot water over a powdered drug or herb, allowing it to infuse, and then straining the mixture once it has cooled.

Synonyms

Churna Drava.

Principle

Agni- Jala Sannikarsha.

General Method of Preparation

क्षुण्णे द्रव्यपले सम्यज्जलमुष्णं विनिक्षिपेत्।
मृत्पात्रे कुडवोन्मानं ततस्तु स्रावयेत् पटात्।।
(Sha.S.M.Kh. 3/1)

1. Add 4 parts of boiling water to 1 part of coarsely powdered drug.
2. Allow the mixture to cool until it is lukewarm. Once lukewarm, macerate the mixture thoroughly.
3. Filter the mixture to obtain the liquid extract.
4. The filtrate is called Phanta.

Prakshepa Dravya

मधुश्वेतागुडादींश्च क्वाथवत्तत्र निक्षिपेत्।
(Sha.S.M.Kh. 3/2)

Same as mention in kvatha kalpana.

Instrument

- **For Small-Scale Production**: Stain-steel Vessel, Glass beakers, Filter paper, Measuring tool, Stirring Rod.
- **For Large-Scale Production**
  1. Stainless Steel Infusion Tank
  2. Steam Jacketed Kettles
  3. High Temperature Pump
  4. Heat Exchanger, etc.

Siddhilakshana

The Phanta should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Storage

- Ideally, Phanta– Instant Use.
- However, Phanta are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in glass bottles while preserving their efficacy.

Dose

स स्याच्चूर्णद्रवः फाण्टस्तन्मानं द्विपलोन्मितम्।
(Sha.S.M.Kh. 3/2)

Dose: 96 ml (2 Pala)

Shelf Life

Sadhyosevana- Instant Use.

Modern Aspect

Hot infusion is a method used to extract beneficial compounds from substances such as herbs, drugs, or plant materials by using hot water. This process is essential in various industries, including pharmaceuticals, food and beverages, and herbal medicine.

Procedure

1. Coarsely powdered or chopped materials are combined with boiling water. The ratio of water to material can vary based on the desired concentration.
2. The mixture is allowed to steep while maintaining high temperatures to facilitate the extraction of soluble compounds. This typically involves keeping the water at or near boiling temperatures for a specified period.
3. After the initial infusion, the mixture is often allowed to cool to a lukewarm temperature to further macerate, ensuring thorough extraction.
4. The liquid is then strained or filtered to remove solid particles, leaving behind a clear, concentrated extract.

Applications

- Used to prepare medicinal extracts that are used in drug formulations.
- Employed in making teas, coffees, and flavored beverages where essential flavors and nutrients are extracted.
- Utilized to prepare herbal infusions that capture the therapeutic properties of plants.

Example

1. Panchakola Phanta

Reference:

पिप्पली पिप्पलीमूलं चव्यचित्रकनागरम्।
दीपनीयः श्रृतो वर्गः कफानिलगदापहः।। (B.R. Jvara 5/188)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Pippali	1 part
2.	Pippalimula	1 part
3.	Chavya	1 part
4.	Chitraka	1 part
5.	Shunthi	1 part
6.	Jala	4 Parts

Procedure

1. Collect all the ingredients of Panchakola Phanta.
2. Add 4 parts of boiling water to 1 part of coarsely powdered drug.
3. Allow the mixture to cool until it is lukewarm. Once lukewarm, macerate the mixture thoroughly.
4. Filter the mixture to obtain the liquid extract.
5. The filtrate is called Panchkola Phanta.

Dose: 48-96 ml

Indication: Dipana, Khapha- vata jvara.

Upakalpana (Secondary Dosage Forms)

1. Kalka Kalpana

a. Churna Kalpana

Introduction

Churna is a dried form of Kalka Kalpana, often used to create Kalka. It refers to the powdered form of a single drug or a mixture of two or more drugs that have been powdered separately and then blended homogeneously. According to the Indian Ayurvedic formulary, Churna is a fine powder of medication or drug mixture. Acharya Kashyapa describes Churna as a fine powder used for treating grahani-roga (digestive disorders), ama vikara (toxicity disorders), vrana (wounds), and as an anjana (collyrium for eyes). Acharya Sushruta also emphasizes the importance of Churna Kalpana in treatment, as noted in the Ashtanga Samgraha and Ashtanga Hridaya. The use of Churna Kalpana continues to increase over time.

Definition

अत्यन्तशुष्कं यद्द्रव्यं सुपिष्टं वस्त्रगालितम्।
तत्स्याच्चूर्णं रजः क्षोदस्तन्मात्रा कर्षसम्मिता।।
(Sha.S.M.Kh. 6/1)

Churna is a term used to describe the fine powder obtained from drugs that have been meticulously dried under the sun and then finely pounded and filtered.

Synonyms: Raja, Kshoda

Principle: Peshana, Galana.

General Method of Preparation of Churana Kalpana

1. **Selection of Raw Materials**:
   - Choose high-quality, pure, and properly identified medicinal herbs.
   - Ensure the herbs are free from contaminants, dirt, and other impurities.
2. **Cleaning**:
   - Clean the selected herbs thoroughly to remove dust, dirt, and foreign materials.
   - Washing might be required for some herbs to ensure cleanliness.
3. **Drying**:
   - Dry the cleaned herbs properly. This can be done using sunlight or shade, depending on the nature of the herb.
   - Ensure the herbs are completely dried to prevent mold growth and to ease the grinding process.
4. **Pulverization (Grinding)**:
   - Grind the dried herbs into a fine powder using a suitable grinder or pulverizer.
   - Traditional methods use stone grinders, while modern methods may use electric grinders.
5. **Sieving**:
   - Sieve the ground powder to obtain a uniform and fine consistency.
   - Use a fine mesh sieve (typically 80-120 mesh) to ensure the powder is of uniform particle size.
6. **Mixing**:
   - If the Churna is a combination of multiple herbs, mix the individual powders thoroughly to ensure homogeneity.
   - Use a clean, dry mixing vessel and mix in a well-ventilated area.
7. **Storage**:
   - Store the prepared Churna in a clean, dry, and airtight container to protect it from moisture, light, and insects.
   - Label the container with the name of the Churna, date of preparation, and expiration date.
8. **Quality Control**:
   - Ensure the Churna is free from moisture and contamination.
   - Perform quality control tests to check for parameters like particle size, purity, and absence of contaminants.

NOTE: Drugs with higher volatile content should not be ground into a very fine powder. Because volatile

component can evaporate during the milling process due to the increased surface area of the crude drugs and the rise in temperature during grinding.

Precautions

1. Ensure all equipment and storage containers are clean and dry.
2. Drugs must be completely dried to prevent microbial growth.
3. Protect the Churna from moisture, light, and pests to maintain its quality and efficacy.

Prakshepa Dravya

चूर्णे गुडः समो देयः शर्करा द्विगुणा भवेत्।
चूर्णेषु भर्जितं हिङ्गु देयं नोत्क्लेदकृद्भवेत्।।
लिहेच्चूर्णं द्रवैः सर्वैर्घृताद्यैर्द्विगुणोन्मितैः।
पिबेच्चतुर्गुणैरेव चूर्णमालोडितं द्रवैः।। (Sha.S.M.Kh. 6/2-3)

1. **Guda**: Equal quantity of Churna.
2. **Sarkara**: Double quantity of Churna.
3. **Bharjita Hingu**: A quantity that does not induce nausea.
4. **Ghrita, Madhu, Taila**: Double quantity of Churna.
5. **Any Drava Dravya**: Four times quantity of Churna.

Instruments

- **For Small-Scale Production**:
  1. Motor pestle
  2. Mixer Grinder
- **For Large-Scale Production**:
  1. Disintegrator
  2. Pulverizer
  3. Mass Mixer

Siddhi Lakshana

1. **Sukshma**: The powder should be finely ground, ensuring all particles are of uniform size.
2. **Nirmala**: The Churna should be free from any impurities, foreign particles, or contaminants.
3. **Snigdha**: When touched, the powder should feel smooth and soft.
4. **Rasa, Gandha, Varna**: The powder should retain the natural taste, aroma, and color of the original herbs used.
5. **Laghutva**: The Churna should be light and easy to digest, without any clumping.
6. **Pata-Sparsha**: When sprinkled over water, the Churna should float, indicating its fineness.

Dose: 1 Karsha (12 gms)

Anupana

चूर्णावलेहगुटिकाकल्कानाम् अनुपानकम्।
वातपित्तकफातङ्के त्रिद्व्येकपलमाहरेत्।। (Sha.S.M.Kh. 6/4)

- Vataja Roga- 3 Pala
- Pittaja Roga- 2 Pala
- Kaphaja Roga- 1 Pala

Shelf Life

1. Sharngadhara Samhita - 2 Months
2. Yogaratnakara Jvara Chikitsa- 3 Months
3. D&C Rule-2016 – 2 Years

Storage

It should be packed in airtight containers or glass bottles with moisture-proof protection.

Modern Aspect

Powders refers to a finely ground herbal substance used in various medicinal preparations. It is a common dosage form that facilitates the use of medicinal herbs by making them easier to administer and digest.

Principle

The principle behind powder (Churna) is to increase the surface area of the medicinal herb, enhancing its efficacy and absorption. By grinding the herb into a fine powder, the active constituents become more accessible and effective when ingested.

Classification

a. Depend upon ingredients

1. **Single Drug Powders**: Powders made from a single herb, used for its specific therapeutic properties.
   - **Examples**: Turmeric powder, Ginger powder.
2. **Compound Powders**: Powders made from a combination of herbs, designed to provide a synergistic effect.
   - **Examples**: Triphala (a blend of Amalaki, Bibhitaki, and Haritaki), Chyavanaprasha (a blend of various herbs and minerals).

b. Depend upon Adminstration

1. **Internal**: Single drug powders, Compound drug powders.
2. **External**: Dusting powders, tooth powders, etc.

Advantages

1. Powders are relatively simple to prepare and do not require complex processing or equipment.
2. They can be easily mixed with liquids (like water, milk, or honey) or used as a base in various formulations.
3. When stored properly in air-tight containers, powders have a longer shelf life compared to some other dosage forms.
4. Finely ground powders increase the surface area of the medicinal herbs, which can improve absorption and efficacy.
5. Powders are easy to dose and can be taken in small quantities, making them convenient for regular use.
6. They allow for easy customization of herbal formulations to meet specific therapeutic needs.

Example

1. Sitopaladhi Churna

Reference: Sharngadharasamhita, Madhyama-khanda, Adhyaya 6/136-138

सितोपला षोडश स्यादष्टौ स्याद्वंशरोचना।।
पिप्पली स्याच्चतुष्कर्षा स्यादेला च द्विकार्षिकी।
एकः कर्षस्त्वचः कार्यश्चूर्णयेत् सर्वमेकतः।।
सितोपलादिकं चूर्णं मधुसर्पिर्युतं लिहेत्।
श्वासकासक्षयहरं हस्तपादाङ्गदाहजित्।।
मन्दाग्निं सुप्तजिह्वत्वं पार्श्वशूलमरोचकम्।।
ज्वरमूर्ध्वगतं रक्तं पित्तमाशु व्यपोहति।।

(Sha.S.M.Kh. 6/136-139)

Ingredient

Sr. No.	Drug Name	Amount
1.	Sita	16 parts
2.	Vamshalochana	8 parts
3.	Pippali	4 parts
4.	Ela	2 parts
5.	Dalachini	1 part

Procedure

1. Gather all the required dried ingredients for Sitopaladhi Churna. Ensure each ingredient is clean and free from impurities.
2. Using a Khalva Yantra or a grinder, grind each ingredient separately into a fine powder.
3. Filter each powdered ingredient through a clean cloth to remove any coarse particles.
4. Combine all the filtered powders together in a clean, dry container. Mix thoroughly to ensure a uniform blend of all ingredients.
5. Filter the compound powder mixture once again through a clean cloth to ensure a fine consistency.
6. Store the final compound powder in sterilized, airtight glass containers to preserve its potency and freshness.
7. Label the containers with the name Sitopaladhi Churna and the preparation date.

Dose: 12 gm

Anupana: Honey and ghee

Indication: Shvasa, Kasa, Kshaya, Hasta-pada-anga daha, Agnimandya, Suptajihva, Parshvashula, Aruchi, Jvara and Urdhvanga Rakhtapitta.

2. Lavana Bhaskaran Churna

Reference: AFI-Part I, Page 114, Sharngadhara Samhita, Madhyamakhanda, 6/138-144

सामुद्लवणं कार्यमष्टकर्षमितं बुधैः।
पञ्च सौवर्चलं ग्राह्यं बिडं सैन्धवधान्यकात्।।
पिप्पली पिप्पलीमूलं कृष्णाजीरकपत्रकम्।
नागकेशरतालीसमम्लवेतसकं तथा।।
द्विकर्षमात्राण्येतानि प्रत्येकं कारयेद् बुधः।
मरिचं जीरकं विश्वमेकैकं कर्षमात्रकम्।।
दाडिमं स्याच्चतुष्कर्ष त्वगेला चार्धकार्षिकी।
एतच्चूर्णीकृतं सर्वं लवणं भास्कराभिधम्।।
शाणप्रमाणं देयं तु मस्तुतक्रसुरासवैः।
वातश्लेष्मभवं गुल्मं प्लीहानमुदरं क्षयम्।।
अर्शांसि ग्रहणीं कुष्ठं विबन्धं च भगन्दरम्।
शोफं शूलं श्वासकासावामवातं च हृद्गुजम्।।
मन्दाग्निं नाशयेदेतद् दीपनं पाचनं परम्।
सर्वलोकहितार्थाय भास्करेणोदितं पुरा।।

(Sha.S.M.Kh. 6/140-146)

Ingredients

Sr. No.	Drug Name	Amount
1.	Samudra Lavana	16 parts
2.	Sauvarchala Lavana	10 parts
3.	Vida Lavana	4 parts
4.	Saindhava Lavana	4 parts
5.	Dhanyaka	4 parts
6.	Pippali	4 parts

Sr. No.	Drug Name	Amount
7.	Pippali Mula	4 parts
8.	Krishna Jiraka	4 parts
9.	Patraka	4 parts
10.	Nagakesara	4 parts
11.	Talisa	4 parts
12.	Amlavetasa	4 parts
13.	Maricha	2 parts
14.	Jiraka	2 parts
15.	Shunthi	2 parts
16.	Dadima (Bija)	8 parts
17.	Tvaka	1 part
18.	Ela	1 part

Procedure

1. Gather all the required dried ingredients for Lavana Bhaskara Churna. Ensure each ingredient is clean and free from impurities.
2. Using a Khalva Yantra or a grinder, grind each ingredient separately into a fine powder.
3. Filter each powdered ingredient through a clean cloth to remove any coarse particles.
4. Combine all the filtered powders together in a clean, dry container. Mix thoroughly to ensure a uniform blend of all ingredients.
5. Filter the compound powder mixture once again through a clean cloth to ensure a fine consistency.
6. Store the final compound powder in sterilized, airtight glass containers to preserve its potency and freshness.
7. Label the containers with the name Lavana Bhaskara Churna and the preparation date.

Dose: 3 gms

Anupana: Mastu, Takra, Warm Water, Asava.

Indications: Agnimandya, Grahani, Vatakaphaja Gulma, Arsha, Pliharoga, Udara Roga, Kshaya, Kushtha, Vibandha, Bhagandara, Sopha, Shula, Shvasa, Kasa, Amavata, Hridruja, Ajirna.

2. Kvatha Kalpana

a. Pramathya Kalpana

Introduction

Pramathya Kalpana is a unique form of liquid preparation in Ayurveda and is considered a subtype (upakalpana) of Kvatha Kalpana.

In Kvatha Kalpana, coarse herbal powder is employed to extract medicinal properties, whereas in Pramathya Kalpana, a fine herbal paste, known as kalka, is used.

This difference in preparation method influences the potency and specific therapeutic applications of Pramathya Kalpana, making it a valuable approach in Ayurvedic treatments where a more refined extraction of the herbs is required.

Principle: Jala- Agni Sannikarsha.

General method of Preparation

प्रमथ्या प्रोच्यते द्रव्यपलात् कल्कीकृताच्छृतात्।
तोयेऽष्टगुणिते तस्याः पानमाहुः पलद्वयम्।।

(Sha.S.M.Kh. 2/150)

1. Collect all the Aushadha Dravya.
2. Preparation of Aushadha Dravya (Kalka Form):
   - Take 48 grams of the medicinal herb (Aushadha Dravya).
   - Grind the herb into a fine paste (Kalka).
3. In a clean pot, add 384 milliliters of water.
4. Mix the prepared Kalka (herbal paste) into the water.
5. Place the pot over a low to medium flame and bring it to a boil.
6. Allow the mixture to boil and reduce, stirring occasionally to ensure even consistency.
7. Continue boiling until the water is reduced to approximately 1/4th of its original quantity.
8. Once the desired reduction is achieved, remove the pot from the heat.
9. Strain the decoction using a fine muslin cloth or a strainer to separate the liquid from the residual herb material.
10. The prepared Pramathya should be consumed fresh. If needed, store it in a clean, airtight container for a short duration.

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**
  - Decoction Boiler or Extraction Kettle
  - Automated Extraction Unit
  - Hydraulic Filter Press
  - Industrial Centrifuge

  - Rotary Vacuum Evaporator or Falling Film Evaporator
  - Agitated Mixing Tank

Siddhi Lakshana

The Pramathya should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Dose: 2 Pala (96 ml)

Shelf Life: Sadhyosevana (Instant Use)

Storage

- Ideally, Pramathya – Instant Use.
- However, Pramathya are often stored for extended periods by using preservatives like benzoic acid, etc. allowing them to be packaged in glass bottles while preserving their efficacy.

Example

1. Mustadi Pramathya

Reference

मुस्तेन्द्रयवैः सिद्धा प्रमथ्या द्विपलोन्मिता।
सुशीता मधुसंयुक्ता रक्तातीसारनाशिनी।।

(Sha.S.M.Kh. 2/151)

Ingredients

Sr. No.	Drug Name	Amount
1.	Musta	½ Part
2.	Indrayava	½ Part
3.	Jala	8 Parts

Procedure

1. Collect all the ingredients of mustadi pramathya.
2. Take Musts Kalka- 24 grams (½ pala) and Indrayava Kalka- 24 grams (½ pala).
3. Preparation of Kalka - Take 24 grams of Musta and 24 grams of Indrayava.
4. Mix both Kalka (herbal pastes) in a clean vessel with 384 ml water.
5. Boil the mixture on a mild flame until the volume reduces to 96 ml (1/4th).
6. Strain the liquid to obtain 96 ml of Mustadi Pramathya.

Dose: 96 ml

Anupana: Honey

Indication: Raktatisara.

b. Paniya Kalpana

Introduction

- Paniya Kalpana refers to the preparation of medicinal liquids meant for internal consumption.
- Derived from the Sanskrit word "Pana", meaning "Drink," these formulations are primarily water-based and involve the extraction of therapeutic properties from medicinal herbs.
- The preparation methods ensure that the medicinal qualities of the herbs are infused into the water, making it suitable for easy ingestion and rapid absorption by the body.

Principle: Jala- Agni Sannikarsha.

General Method of Preparation

क्षुण्णं द्रव्यपलं साध्यं चतुःषष्टिपले जले।
अर्धशिष्टं च तद्देयं पाने भक्तादिसंविधौ।। (Sha.S.M.Kh. 2/157)

1. Take all the ingredients of Aushadha Dravya- 48 grams (1 pala) and water- 3 liters (64 pala).
2. Take 48 grams of Aushadha Dravya and add it to 3 liters of water in a clean stainless steel vessel.
3. Place the vessel on a mild flame and bring the mixture to a boil.
4. Continue boiling the mixture until the volume is reduced by half, leaving approximately 1.5 liters (32 pala) of the liquid.
5. If required, strain the reduced liquid to remove any solid residues.
6. The resulting 1.5 liters of decoction is the prepared Paniya Kalpana.

Siddhi Lakshana

The Paniya Kalpana should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**
  - Decoction Boiler or Extraction Kettle
  - Automated Extraction Unit
  - Hydraulic Filter Press
  - Industrial Centrifuge

- Rotary Vacuum Evaporator or Falling Film Evaporator
- Agitated Mixing Tank

Shelf Life: Sadhyosevana- Instant Use.

Storage: Ideally, Instant Use or for further purpose.

Example:

1. Shadangapaniya Kalpana

Reference

उशीरपर्पटोदिव्यमुस्तनागरचन्दनैः।
जलं शृतं हिमं पेयं पिपासाज्वरनाशनम्।।

(Sha. S.M.Kh. 2/158)

Ingredients

Sr. No.	Drug Name	Amount
1.	Ushira	1 Part
2.	Parpata	1 Part
3.	Udhichaya	1 Part
4	Musta	1 Part
5.	Nagara	1 Part
6.	Chandana	1 Part

Procedure

1. Take all the ingredients of Shadangapaniya Dravya- 1 Part each and water- 64 parts.
2. Take one part of Shadangapaniya Dravya each and add it to 64 times of water in a clean stainless steel vessel.
3. Place the vessel on a mild flame and bring the mixture to a boil.
4. Continue boiling the mixture until the volume is reduced by half, leaving approximately 32 parts of the liquid.
5. If required, strain the reduced liquid to remove any solid residues.
6. The resulting of decoction is the prepared Shadangapaniya Kalpana.

Dose: 2 Pala (96 ml)

Indication: Pipasa, Jvara.

c. Ushnodaka

Introduction

- Ayurveda emphasizes maintaining the equilibrium of doshas for perfect health, with Ushnodaka playing a crucial role in digestion and detoxification.
- Drinking warm water supports proper digestion by preserving Agni (digestive fire) and preventing the dilution of digestive juices.
- Cold liquids slow down digestion by cooling the stomach, requiring the body to expend additional energy to bring the stomach contents to body temperature.
- Incomplete digestion due to cold intake leads to partially digested food moving through the digestive tract, which may not be fully eliminated.
- Proper digestion and elimination are vital to prevent toxin buildup in the intestines, ensuring nutrients are effectively absorbed into the body.

Definition

Ushnodaka refers to warm water in Ayurveda, classified under Upakalpana of Kvatha Kalpana where water is boiled (Kvathana), not just heated.

Principle: Jala- Agni Sannikarsha

General method of Preparation

अष्टमेनांशशेषेण चतुर्थेनार्धकेन वा।
अथवा क्वथनेनैव सिद्धमुष्णोदकं वदेत्।।
श्लेष्मामवातमेदाघ्नं बस्तिशोधनदीपनम्।
कासश्वासज्वरहरं पीतमुष्णोदकं निशि।।

(Sha.S.M.Kh. 2/159-160)

1. Taking clean and soft drinking water in a clean stainless steel vessel.
2. Place the vessel over a mild flame to gently heat the water.
3. Allow the water to reach a boil and continue boiling it.
4. Continue boiling until the water reduces to one-eighth (1/8), one-fourth (1/4), or half (1/2) of its original quantity.
5. Alternatively, you can boil the water until one-third (1/3) of the water remains, as per Adhamalla Tikka.
6. Once reduced, the Ushnodaka is ready for use as prescribed, either as an Anupana (accompanying liquid) or Sahapana (taken along with medicine).

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**:

Large size utensils used

Shelf Life: Instant Use

Indication: Kapha-Vata-Medha Doshahara, Basti Shodhana, Dipana, Kasa, Shvasa, Jvarahara.

Storage: Ideally, Instant use or for further purpose.

d. Kshira Paka Kalpana

Introduction

- Kshira Paka Kalpana is a unique Upakalpana of Kvatha Kalpana, where milk and water are used as the liquid media for preparing herbal formulations.
- Both milk and water are combined in specific proportions to create a balanced medium for the preparation.
- Herbs with Kashaya Rasa (astringent taste) are commonly used in Kshira Paka to make the preparation more palatable and reduce the irritability of the taste.
- The milk in the preparation helps to mask or neutralize the strong or unpleasant flavors of the herbs, making the formula easier to consume.
- Herbs that possess Tikshna (intense or strong) properties have their sharpness or intensity moderated by the milk, reducing any harsh effects.
- This method not only enhances the medicinal efficacy of the herbs but also improves taste, digestibility, and patient compliance.

Principle: Jala- Agni Sannikarsha.

General Method of Preparation

क्षीरमष्टगुणं द्रव्यात्क्षीरान्नीरं चतुर्गुणम्।
क्षीरावशेषं तत्पीतं शूलमामोद्भवं जयेत्।।

(Sha.S.M.Kh. 2/161)

1. Collect all the specific ingredients.
2. Take 1 part of the herb (e.g., Arjuna), 8 parts of milk and add 32 parts of water.
3. Combine the herb, milk, and water in a clean vessel.
4. Place the vessel over a moderate flame and begin boiling.
5. Continue boiling the mixture until all the water evaporates and only the milk remains.
6. Filter the final product and store it properly.
7. Used for the treatment of conditions such as Shula (pain) and Aama (toxins or undigested food).

Note :

1. According to Yadavji Trikamji– The ratio of the drug, milk, water is 1:15:15
2. According to Bhaishajya Ratnavali - The ratio of drug, milk, water is 1:8:8

Prakshepa Dravya: Shita

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**
  - Decoction Boiler or Extraction Kettle
  - Automated Extraction Unit
  - Hydraulic Filter Press
  - Industrial Centrifuge
  - Rotary Vacuum Evaporator or Falling Film Evaporator
  - Agitated Mixing Tank

Siddhi Lakshana

The kshira paka should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Dose: 2 Pala (96 ml)

Shelf Life: Instant Use

Storage: Instant use

Example:

1. Arjun Kshirapaka

Reference: B.R. Hridroga 33/11

अर्जुनस्य त्वचा सिद्धं क्षीरं योज्यं हृदामये।
सितया पञ्चमूल्या वा बलया मधुकेन वा।। (B.R.Hr.Ro. 33/11)

Ingredients

Drug Name	Proportion
Arjuna	20 gms
Go-Kshira	160 ml
Jala	640 ml
Reduced to	160 ml

Procedure

1. Gather all the required ingredients, including Arjuna bark and milk. Ensure the ingredients are clean and free from impurities.
2. In a stainless steel vessel, combine all the ingredients. The primary ingredient should

be Arjuna bark, and the liquid used will be a mixture of water and milk.

3. Add the required amount of water and milk to the vessel. The typical ratio is 1 part (20 gms) of Arjuna bark, 32 parts (640 ml) of water, and 8 parts (160 ml) of milk.
4. Reduce the heat and let it simmer. Continue to boil until the water portion evaporates and only the milk portion is left.
5. Stir the mixture occasionally to prevent the ingredients from sticking to the bottom of the vessel and to ensure even boiling.
6. Once the water has evaporated and only the milk portion remains, remove the vessel from heat.
7. Filter the mixture through a clean cloth or a fine sieve to remove the solid residues.

Dose: 50 ml

Indications: Hridroga

2. Rasona Kshira Paka

Reference: B.R. Gulma Rogadhikara 32/13-14

साधयेच्छुद्धशुष्कस्य लशुनस्य चतुष्पलम्।
क्षीरोदकेष्टगुणिते क्षीरशेषञ्च पाययेत्।।
वातगुल्ममुदावर्त्तं गृध्रसीं विषमज्वरम्।
हृद्रोगं विद्रधिं शोथं नाशयत्याशु तत्पयः।
एवन्तु साधिते क्षीरे स्तोकमेवात्र दीयते।।

(B.R., Gulma.Ro. 32/13-14)

Ingredients

Sr. No.	Drug Name	Proportion
1.	Nishtusha Lashuna	192 gms
2.	Go Kshira	768 ml
3.	Jala	768 ml
4.	Reduced to	768 ml

Procedure

1. Gather all the required ingredients, including Lashuna/Garlic Bud and milk. Ensure the ingredients are clean and free from impurities.
2. In a stainless steel vessel, combine all the ingredients. The primary ingredient should be Arjuna bark, and the liquid used will be a mixture of water and milk.
3. Add the required amount of water and milk to the vessel. The typical ratio is 1 part (192 gms) of Nishtusha Lashuna, 8 parts (768 ml) of water, and 8 parts (768 ml) of milk.
4. Reduce the heat and let it simmer. Continue to boil until the water portion evaporates and only the milk portion is left.
5. Stir the mixture occasionally to prevent the ingredients from sticking to the bottom of the vessel and to ensure even boiling.
6. Once the water has evaporated and only the milk portion remains, remove the vessel from heat.
7. Filter the mixture through a clean cloth or a fine sieve to remove the solid residues.

Dose: 100 ml

Indications: Gulma, Gridhrasi, Vishana jvara, Hridroga, Vidradi, Shotha.

e. Laksha Rasa

Introduction

Source: A resinous exudation from the new branches of trees such as banyan, croton, and Pipal

Color: It is usually red or dark brown, with a characteristic — and often unpleasant — odor.

Insect Interaction: Specific insects feed on the young twigs of these trees. The females lay eggs (oviposition) and afterward die.

Secretion Process: Dead female insects exude a reddish liquid after their death, creating a solid crust around the branches.

Formation: That deposit is the Laksha, a kind of web formed between the secretion of the insects and the juice or gummy matter from the tree, growing to be about an inch in thickness.

Role of the Insect: The insects are also responsible for affecting the sap or the gum of the trees, with this activity, we get out Laksha.

Synonyms

- Sanskrit Name: Laksha
- English Name: Lac
- Hindi Name: Mah

Principle: Toya-agni Samskara

Preparation

a. Method - 01

Reference

षड्गुणेनाम्भसा लाक्षां दोलायन्त्रे विपाचयेत्।
त्रिसप्तधा परिस्त्राव्या लाक्षारसमिमं विदुः।।

(Dravya.G.Vi.Yadavji)

1. Take 1 part of Laksha (lac resin).

2. Thoroughly clean the Laksha by removing all foreign particles.
3. Collect the cleaned Laksha in a cloth to make a pottali (herbal bundle).
4. Hang the pottali in a vessel with 6 parts water.
5. Keep the pottali submerged overnight so that the Laksha softens and melts.
6. The next morning, remove the pottali from the water.
7. Rub the softened Laksha with hands while it is still in the water to extract the resin.
8. Sieve the liquid through a cloth, repeating this 21 times to completely purify the liquid.
9. After 21 filtrations, the red liquid obtained is called Laksha Rasa.
10. Collect this Laksha Rasa for further medicinal use.

b. Method- 02

Reference: Rasa Tantra Sara Evam Siddha Prayoga Samgeraha.

Ingredients

Sr. No	Drug Name	Proportion
1.	Laksha	10 parts
2.	Lodhra tvaka	1 part
3.	Sajjikshara	1 part
4.	Badar patra	Q.S.
5.	Jala	40 parts

Procedure

1. Collect all ingredients (as per Method 02) and tie them in a cloth to form a pottali.
2. Suspend the pottali in a vessel of water.
3. Heat over mandagni (low flame) until the liquid reduces to 1/4th.
4. Filter the reduced liquid 21 time through a clean cloth.
5. The filtered liquid is Laksha Rasa Kalpana, ready for use. Store in a clean container.

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**: Large size utensils used

Siddhi Lakshana

a. Color- Red

b. Odor- Charaterstics

Dose: 24 ml

Indication: Asrikdara, Pradara, Raktapitta and Raktasrida.

Shelf Life: Instant use

Storage: Instant use

Example: Lakshadi Taila

f. Mamsa Rasa

Introduction

A soup prepared by boiling chopped meat with required ratio of water.

2, 4, 6 or 8 times is added to 1 part of chopped meat considering the nature of the meat.

The mixture is boiled in clen stainless steel vessel over moderate fire and meat part is properly cooked.

Definition: A soup prepared by boiling chopped meat with required ratio of water.

Principle: Toya-agni Samskara.

Types

a. According to Quantity

1. Ghana Mamsa Rasa
2. Madhyama Mamsa Rasa
3. Tanu Mamsa Rasa

b. According to Ingredients

1. **Akrita Mamsa Rasa**: When meat part properly cooked with water. Hence no other spicy ingredients will be added.
2. **Krita Mamsa Rasa**: When meat properly cooked with water by adding needed quantity of sneha, Lavana, jiraka, mircha, Shunthi.

General method of Preparation

पाक पात्रे घृतं दद्यात्तैलञ्च तदभावत्।
तत्र हिंगु, हरिद्रा च भर्जयेत्तदनन्तरम्।।
ह्यागादेशस्थ रहित मासं तत्खण्डित धुव।
धौत निर्णालित तस्मिन्घृते तदुर्जयेच्छनैः।।
सिद्धयोग्यं जलं दत्त्वा लवणन्तु पचेत्ततः।
सिद्धे जलेन सम्पिष्य बेसवार परिक्षिपेत्।।

(Bh.Pr.Kritt. 80-82)

1. Take Ghrita (clarified butter) in a vessel and heat it gently.
2. Add Hingu and Haridra to the heated Ghrita and fry them well.
3. Add the Mamsa into the vessel and fry it thoroughly in the Ghrita mixture until well-cooked.

4. Once the meat is fried, add water and Lavana (salt) as needed to the mixture.
5. Finally, add Veshvara (spices or seasoning) and stir it well.
6. Allow the mixture to cook until all ingredients are properly blended, and the liquid becomes flavorful.

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**: Large size utensils used.

Siddhi Lakshana

The mamsa rasa should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Properties: Tripatikaraka, Hridya, chronic disease, kshinnayatas.

Shelf Life: Instant Use

Storage: Instant Use

3. Hima Kalpana

a. Mantha Kalpana

Definition

नातिद्रवा नातिसान्द्रा मन्थ इत्युपदिश्यते। (Su.Su. 46/385)

Mantha is a preparation with a medium consistency, neither too thin nor too thick, as per the specified reference.

Principle: Toya- agni Samskara

General method of Preparation

1. Take one Pala (approximately 48 grams) of Aushadhi Churna (herbal powder) in an earthen pot.
2. Add four times the amount of cold water (192 ml) to the herbal powder.
3. Churna the mixture well until the contents are thoroughly mixed and the extract is fully dissolved.
4. The prepared liquid is known as Mantha.

Instruments

- **For Small-Scale Production**: Stain-steel Vessel, Heating Equipment, etc.
- **For Large-Scale Production**: Large size utensils used.

Siddhi Lakshana

The final product should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Dose: 2 Pala

Shelf Life: Instant Use

Storage: Instant Use

Example

Kharjuradi Mantha

Reference: Sha. Samhita Madhyama Khanda 3/11

खर्जूरदाडिमीद्राक्षातिन्तिडीकाम्लिकामलै: ।।
सपरूषै: कृतो मन्थ: सर्वमद्यविकारनुत्। (Sha.S.M.Kh. 3/10)

Ingredients Used

Sr. No.	Drug Name	Proportion
1.	Khajura	1 Part
2.	Dadima	1 Part
3.	Munnaka	1 Part
4.	Imali	1 Part
5.	Changeri	1 Part
6.	Amalaki	1 Part
7.	Phalasa	1 Part
8.	Jala	4 Parts

Procedure

1. Obtain all the required ingredients for Kharjuradi Mantha. Ensure each ingredient is clean and free from impurities.
2. Using a Khalva Yantra, grind all the ingredients together to make a fine paste.
3. Transfer the paste into a clean earthen pot and add four times the amount of water to the paste.
4. Allow the mixture to soak in the water for 1 to 2 hours.
5. After soaking, churn the mixture thoroughly. Rub the contents with your hands to ensure maximum extraction of the medicinal properties.
6. Filter the mixture through a clean cloth to remove the solid residues.
7. Collect the filtered liquid in a clean container. This liquid is known as Kharjuradi Mantha.

Dose: 2 Pala

Therapeutic Indications: Madhatya.

b. Udaka Kalpana

Introduction

Udaka is a sub-type (upakalpana) of Hima Kalpana. It involves the preparation of water-soluble extracts from medicinal herbs, which are used for therapeutic purposes. This method is designed to capture the active components of the herbs in water, making it a gentle yet effective form of medication.

Principle: Toya Samskara

General method of Preparation

1. Take one part of the de-husked drug (e.g., rice grains) in a vessel.
2. Add eight parts of water to the drug.
3. Mix the contents thoroughly to ensure even blending.
4. Leave the mixture undisturbed for 1–2 hours to allow proper soaking.
5. Macerate the mixture well, ensuring the drug is broken down.
6. Filter the mixture to obtain the liquid extract.

NOTE : According to Siddha Yoga Manimala: - 6 times of water taken.

Prakshepa Dravya: Sugar, Honey

Instruments

- **For Small-Scale Production**: Small Stain-steel Vessel, Spatula, etc.
- **For Large-Scale Production**: Large size utensils used.

Siddhi Lakshana

The Final product should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Dose: 96 ml

Shelf Life: Instant Use

Storage: Instant Use

Example:

a. Tandulodaka

कण्डितं तण्डुलपलं जलेऽष्टगुणिते क्षिपेत्।
भावयित्वा जलं ग्राह्यं देयं सर्वत्र कर्मसु।। (Sha.S.M.Kh. 1/32)

1. Take 1 Pala (approximately 48 grams) of rice and grind it well.
2. Add eight times the amount of water to the ground rice.
3. Wash the mixture thoroughly and collect the liquid.
4. Let the mixture sit undisturbed for 2 hours after adding water.
5. Decant the liquid carefully, separating it from the solid particles.
6. The resulting liquid is known as Tandulodaka.

Use: Anupana (vehicle) for Pushyanuga Churna.

c. Panaka Kalpana

Introduction

Panaka, though not explicitly mentioned in classical Ayurvedic texts, has been widely used in traditional practices.

It was first introduced into Ayurvedic pharmaceutics by Yadavji Trikamji in the 20th century.

Panaka is typically prepared using fruits that possess amla (sour) and madhura (sweet) rasa, such as pineapple (Ananasa), mango (Mara), tamarind (Chincha), pomegranate (Dadima), and muskmelon (Kharbuja).

This method is particularly suitable for fruits that are unripe or those from which juice is not easily extracted by squeezing.

Panaka serves as a refreshing beverage and is known for its health benefits, especially during hot weather, as it balances the doshas and provides hydration.

Principle: Toya- Agni Samskara.

General method of Preparation

1. Choose unripe fruits suitable for making Panaka.
2. Place the unripe fruits on a low flame (Mandaagni) and cook them thoroughly until they become soft.
3. After cooking, pound the softened fruits well to form a smooth paste.
4. Extract the juice from the pounded fruit paste by pressing or straining.
5. Take the extracted juice and add 16 times the amount of cold water to it.
6. Mix the juice and water thoroughly to prepare Panaka.

Prakshepa Dravya: Sugar, Honey.

Instruments

- **For Small-Scale Production:** Small Stain-steel Vessel, Spatula, Heating Devices, Motar-Pestle, etc.

❖ **For Large-Scale Production**: Large size utensils, Pressing Machine, Steam Jacketed Boiler, etc.

Siddhi Lakshana

The Final product should retain the Gandha (aroma), Varna (color), and Rasa (taste) of the original plant material, confirming that the active principles have been successfully extracted.

Dose: 96 ml

Shelf Life: Instant Use

Storage: Instant Use

Example:

1. Chincha Panka

Reference: Anubhuta Yoga

Ingredients

Sr. No.	Drug Name	Proportion
1.	Chicha Phala	1 Part
2.	Jala	4 Parts
3.	Khanda sharkara	2 Parts
4.	Saindhava Lavana	1/10th Part
5.	Fried Jiraka Churna	1/10th Part
6.	Fried Maricha Churna	1/20th Part

Procedure

1. Remove the seeds from ripe tamarind and soak it in water for 1 to 2 hours.
2. After soaking, thoroughly macerate the tamarind to extract the liquid portion.
3. Filter the liquid to remove any solid residue, ensuring a smooth consistency.
4. Add the powders of the remaining drugs to the filtrate, mixing well to ensure even distribution.
5. The preparation should be used immediately after mixing for optimal therapeutic effects.

Dose: 96 ml

Indication: Agnimandya, Ajirna, Aruchi, Adhmana, Atopa.

4. Phanta Kalpana

a. Arka

Introduction

1. Arka Kalpana refers to a distillation process that extracts the volatile constituents of medicinal drugs in a water-based medium.
2. Drugs with active principles in the form of volatile oils are ideal for Arka preparation, as these constituents may evaporate during Kvatha (decoction) preparation.
3. Common herbs used in Arka Kalpana include Gulaba Pushpa, Chandana, and Yavani.
4. Arka is considered more stable compared to other Ayurvedic formulations such as Svarasa (fresh juice), Kalka (herbal paste), Kvatha (decoction), Hima (cold infusion), and Phanta (hot infusion).
5. It has superior palatability, an appealing color, and higher acceptance among users.

Definition

Arka is a preparation obtained through the process of distillation, where water-soaked raw drugs are heated. The volatile principles released along with the water vapors are condensed and collected, forming the final product. This method captures the essential active components of the raw materials.

Principle: Vaporization and Condensation.

General method of Preparation

1. Begin by cleaning the selected drugs thoroughly and coarsely powdering them.
2. Add a sufficient quantity of water to the powdered drugs and let them soak overnight. This softens the drugs, making it easier to release their volatile principles during distillation.
3. The following morning, transfer the soaked drugs into the Arka yantra (distillation apparatus) and add the remaining water.
4. Heat the mixture, allowing the vapors to rise and be condensed into the receiver. Initially, the vapors mostly consist of steam and may not contain the essential volatile components, so this initial portion should be discarded.
5. Continue distilling and collect the aliquots that contain the therapeutically active ingredients. The final portion may also lack essential substances and should be avoided.
6. The collected aliquots from the middle portion, which contain the active ingredients, should be mixed together to ensure uniformity in the Arka preparation.

Instruments

❖ **For Small-Scale Production**: Small Stain-steel Vessel, Spatula, Distillation Appratus small size, etc.

❖ **For Large-Scale Production**: Large size distillation apparatus, utensils, etc.

Siddhi Lakshana

1. The distillate should be clear and transparent without any suspended particles or cloudiness, indicating proper separation of volatile principles.
2. It should possess a distinct and pleasant fragrance characteristic of the volatile principles of the raw drugs used, signifying the extraction of essential oils.
3. The distillate should have a taste reflecting the inherent properties of the original ingredients, indicating that the active components have been captured effectively.
4. The color of the Arka may vary depending on the raw material used, but it should not be excessively dark or altered from the natural expectation of the herbs distilled.
5. The distillate should be free-flowing, without any stickiness or viscosity, ensuring it is purely a water-based extraction of volatile compounds.
6. There should be no excess water that dilutes the therapeutic components; this ensures that the volatile principles are properly concentrated.
7. The distillate should contain the essential volatile principles in a potent form, which can be determined by its characteristic fragrance, taste, and therapeutic efficacy.

Dose: 10- 24 ml.

Shelf Life: 1 Year.

Storage

जीर्णास्थिपात्रे गृह्णीयादर्कं वा काचसम्भवे।
पाषाणकेऽथवा पात्रे ह्यभावे मृण्मयेन्यसेत्॥ (A.A. 1/87)

Tightly stopped glass bottle because exposed to air will lose volatile medicine principle.

Example

1. Mishreya Arka

Reference: AFI, Part 1, Vol. 1 A, Pg.106

मिश्रेयाया वह्निमान्द्ययोनिशूलकृमीन् हरेत्।

(Ak.Pra. 3/10)

Ingredients Used

Drug Name	Part Used	Proportion
Misreya	Fr.	1 Part
Water	–	7 Parts
Distilled Recoversd as Arka	–	5 Parts

Procedure

1. Coarsely powder the Mishreya (fennel seeds).
2. Soak the coarse powder in a sufficient quantity of water and leave it overnight to soften the material.
3. The next morning, transfer the soaked Mishreya into the Arka Yantra (distillation apparatus) and add the remaining water.
4. Heat the mixture to initiate the distillation process. The vapors generated during heating are condensed and collected to obtain the Arka.
5. Continue distilling until the desired quantity of Arka is obtained, which contains the volatile active principles of Mishreya.

Dose: 12 to 24 ml

Therapeutic Uses: Mandaagni, Adhmana, Shula, Krimi, Yonishula.

Multiple Choice Questions

1. **Which of the following is NOT a form of Panchavidha Kashaya Kalpana?**
   a. Svarasa b. Kalka
   c. Taila d. Phanta
2. **According to Charaka Samhita, what is Svarasa?**
   a. The juice obtained from pounding dry herbs.
   b. The juice extracted from fresh herbs using mechanical force.
   c. A decoction prepared by boiling herbs.
   d. A paste made from medicinal plants.
3. **What is the first step in the preparation of Svarasa?**
   a. Boiling the herbs.
   b. Crushing the herbs to break down the plant material.
   c. Adding honey to the juice.
   d. Mixing the herbs with water.

4. **For dry drugs, how long is the drug soaked in water according to the Svarasa preparation method?**
   a. 3 hours b. 6 hours
   c. Overnight d. 12 hours
5. **What is the indication for using Adraka Svarasa as per Sharngadhara Samhita?**
   a. Shvasa (respiratory issues)
   b. Fever
   c. Digestive problems
   d. Skin diseases
6. **What is the correct dose of Putapaka Svarasa for administration?**
   a. 12 ml b. 24 ml
   c. 36 ml d. 48 ml
7. **Which of the following is considered the most potent form of Panchavidha Kashaya Kalpana?**
   a. Kalka b. Shita
   c. Svarasa d. Phanta
8. **What is the synonym for Svarasa mentioned in the classical texts?**
   a. Churna b. Niryasa
   c. Taila d. Shrita
9. **According to Sharngadhara Samhita, how is the juice extracted from tender drugs?**
   a. By boiling the herbs.
   b. Through mechanical squeezing after wrapping in leaves and coating with mud.
   c. By soaking in water for 24 hours.
   d. By making a decoction and then straining it.
10. **In modern pharmaceutical terms, what is the principle behind extracting Svarasa?**
    a. Separation of solids from liquids using boiling.
    b. The mechanical application of force to extract liquid from plants.
    c. Chemically treating the herbs to extract their components.
    d. Heating the herbs to release their active ingredients.
11. **What is the main purpose of using Svarasa in Ayurveda?**
    a. Long-term treatment of chronic conditions
    b. Quick therapeutic action in acute conditions
    c. Preparation of ointments
    d. Enhancing the flavor of herbal teas
12. **According to Ayurvedic texts, what is the correct method to extract Svarasa from very hard drugs?**
    a. By boiling the drugs in 8 times the amount of water until reduced to one-fourth.
    b. By soaking them in water for 12 hours.
    c. By grinding and squeezing the drugs manually.
    d. By boiling them in milk.
13. **Which instrument is traditionally used for crushing herbs in the preparation of Svarasa?**
    a. Khalva Yantra (mortar and pestle)
    b. Chakki (grinding stone)
    c. Bhastri Yantra (bellows)
    d. Sharava Samputa (clay pot)
14. **What is the shelf life of Svarasa according to Yogaratnakara in Jvara Chikitsa?**
    a. 24 hours b. 6 hours
    c. 3 hours d. 12 hours
15. **In the preparation of Adraka Svarasa, what is the recommended Anupana (adjuvant)?**
    a. Ghee b. Milk
    c. Honey d. Water
16. **What is the recommended water-to-herb ratio when preparing Kvatha from very hard drugs?**
    a. 4 times water b. 8 times water
    c. 12 times water d. 16 times water
17. **What is the significance of the term "Kvatha" in Ayurveda?**
    a. It refers to mixing herbs in ghee
    b. It means boiling herbs in water to prepare a decoction
    c. It refers to dry powder of herbs
    d. It is a type of fermented Ayurvedic preparation
18. **According to Sharngadhara Samhita, what quantity of water is recommended for medium or hard herbs in Kvatha preparation?**
    a. 16 times water b. 8 times water
    c. 4 times water d. 2 times water
19. **What is the purpose of boiling Kvatha without a cover, as described in the Samhitas?**
    a. To prevent the herbs from burning
    b. To ensure the aroma of herbs is not lost
    c. To allow water to evaporate and reduce the volume
    d. To improve the taste of the preparation

20. **Which one of the following herbs is commonly added to Kvatha as a Prakshepa Dravya for Vataja disorders?**
    a. Sita b. Honey
    c. Ghee d. Jiraka
21. **What is the primary reason for using the Hima (cold infusion) method in Ayurveda?**
    a. To enhance the color of the herbs
    b. To preserve the Shita Virya (cold potency) and volatile components
    c. To reduce preparation time
    d. To increase the heat-stable compounds
22. **What is the general method of preparation for Hima?**
    a. Boiling herbs in water
    b. Steeping herbs overnight in cold water
    c. Drying herbs in the sun
    d. Grinding herbs into fine powder
23. **In the preparation of Hima, how much water is generally used for one part of the herbal substance?**
    a. 16 parts b. 12 parts
    c. 6 parts d. 4 parts
24. **Which of the following is a synonym for Hima in Ayurveda?**
    a. Ushna Kashaya b. Kashaya Kalpana
    c. Shita Kashaya d. Guggulu Kalpana
25. **What is the typical shelf life of Hima?**
    a. 1 day b. 7 days
    c. 2 years d. Instant use
26. **What is Phanta Kalpana primarily used for?**
    a. Preparing potent decoctions
    b. Preparing mild, easily digestible herbal infusions
    c. Extracting volatile oils
    d. Preparing concentrated powders
27. **What is the general method for preparing Phanta?**
    a. Soaking herbs in cold water overnight
    b. Boiling herbs in water for hours
    c. Pouring hot water over powdered herbs and allowing them to infuse
    d. Drying herbs under the sun
28. **Which principle does Phanta Kalpana primarily rely on?**
    a. Agni-Jala Sannikarsha
    b. Pitta-Kapha balance
    c. Cold infusion
    d. Steam distillation
29. **Which preparation is an example of Phanta in Ayurveda?**
    a. Panchkola Phanta b. Triphala Kvatha
    c. Guduchi Kalka d. Ashwagandha Leha
30. **What is the general dose of Phanta recommended in Ayurveda?**
    a. 24 ml b. 48-96 ml
    c. 120 ml d. 15 ml
31. **What is the primary principle behind Churna Kalpana in Ayurveda?**
    a. Snehana and Svedana
    b. Peshana and Galana
    c. Virechana and Basti
    d. Rasayana and Vajikarana
32. **Which of the following is NOT an indication of Churna as described by Acharya Kashyapa?**
    a. Grahani-roga (Digestive disorders)
    b. Ama vikara (Toxicity disorders)
    c. Vrana (Wounds)
    d. Tvak roga (Skin diseases)
33. **Which step in the preparation of Churna involves ensuring the uniform particle size of the powdered herbs?**
    a. Drying b. Pulverization
    c. Sieving d. Mixing
34. **What should the powder do when sprinkled over water to indicate proper fineness (Pata-Sparsha)?**
    a. Dissolve immediately b. Float on the water
    c. Sink to the bottom d. Form clumps
35. **According to Sharangadhara Samhita, what is the shelf life of most Churna preparations?**
    a. 1 month b. 2 months
    c. 6 months d. 2 years
36. **Which of the following is used in Sitopaladhi Churna to enhance its medicinal properties?**
    a. Honey and Ghee b. Takra (Buttermilk)
    c. Warm Water d. Oil and Sugar
37. **What is the recommended dose for most Churna preparations, including Sitopaladhi Churna?**
    a. 5 grams b. 12 grams
    c. 10 grams d. 20 grams
38. **Which drug ingredient is NOT part of the preparation of Lavana Bhaskara Churna?**
    a. Saindhava Lavana b. Dadima (Bija)
    c. Sitopaladi d. Nagakesara

39. Which Anupana (vehicle) is suggested for administering Lavana Bhaskara Churna?
a. Mastu (Whey) b. Ghee and Honey
c. Hot Milk d. Cold Water

40. According to Sharngadhara Samhita, what is the general classification of Churna based on ingredients?
a. Powdered drugs for internal use only
b. Single and compound drug powders
c. External use only
d. For treating only digestive disorders

41. What type of preparation is Pramathya Kalpana in Ayurveda?
a. Solid preparation
b. Liquid preparation
c. Semi-solid preparation
d. Oil-based preparation

42. What is the main difference between Pramathya Kalpana and Kvatha Kalpana?
a. Pramathya uses Kalka (fine paste), and Kvatha uses coarse powder.
b. Kvatha uses Kalka, and Pramathya uses fine powder.
c. Kvatha is a solid form, and Pramathya is a liquid form.
d. Both use the same preparation methods.

43. According to the classical method, how much water is used for preparing Pramathya from 1 Pala of Kalka?
a. 4 times the quantity of Kalka
b. 8 times the quantity of Kalka
c. 10 times the quantity of Kalka
d. 16 times the quantity of Kalka

44. Which of the following equipment is used for small-scale production of Pramathya?
a. Decoction Boiler
b. Agitated Mixing Tank
c. Stainless-steel vessel and heating equipment
d. Industrial Centrifuge

45. What is the recommended dose of Pramathya according to classical texts?
a. 1 Pala (48 ml) b. 2 Pala (96 ml)
c. 4 Pala (192 ml) d. 8 Pala (384 ml)

46. What does the term "Paniya" in Paniya Kalpana refer to?
a. Solid food preparation
b. Drinkable liquid preparation
c. Oil-based preparation
d. Paste-based preparation

47. How much water is typically used in the preparation of Paniya Kalpana for 1 Pala (48 grams) of Aushadha Dravya?
a. 1 liter b. 2 liters
c. 3 liters d. 5 liters

48. What is the general principle behind the preparation of Paniya Kalpana?
a. Agni-Soma Sannikarsha
b. Vayu-Jala Sannikarsha
c. Jala-Agni Sannikarsha
d. Prithvi-Akasha Sannikarsha

49. Which of the following is an example of Paniya Kalpana?
a. Kvatha Kalpana
b. Shadangapaniya Kalpana
c. Avaleha Kalpana
d. Ghrita Kalpana

50. Which condition is Shadangapaniya Kalpana indicated for?
a. Rakta Atisara
b. Pipasa (thirst) and Jvara (fever)
c. Agnimandya (weak digestion)
d. Vata disorders

51. What does the term "Ushnodaka" refer to in Ayurveda?
a. Cold water b. Warm water
c. Herbal water d. Medicinal oil

52. Which Ayurvedic principle is followed in the preparation of Ushnodaka?
a. Agni-Soma Sannikarsha
b. Vayu-Jala Sannikarsha
c. Jala-Agni Sannikarsha
d. Prithvi-Akasha Sannikarsha

53. What is the reduction stage commonly used during the preparation of Ushnodaka?
a. 1/2 of the original water quantity
b. 1/4 of the original water quantity
c. 1/8 of the original water quantity
d. All of the above

54. Which doshas does Ushnodaka primarily help to balance according to Ayurvedic principles?
a. Vata and Pitta b. Pitta and Kapha
c. Kapha and Vata d. Vata and Rasa

55. What are the indications for consuming Ushnodaka as per Ayurvedic texts?
a. Jvarahara (fever), Kasa (cough), Shvasa (asthma)
b. Aamadosha and Pitta disorders
c. Agnimandya (weak digestion)
d. Vata-related neurological disorders

56. What is the primary liquid medium used in Kshira Paka Kalpana?
a. Only water b. Milk and water
c. Ghee and water d. Herbal oil

57. In Kshira Paka Kalpana, which taste (rasa) is commonly neutralized by using milk?
a. Madhura (sweet)
b. Kashaya (astringent)
c. Tikta (bitter)
d. Amla (sour)

58. What is the main purpose of adding milk to herbal formulations in Kshira Paka Kalpana?
a. To enhance the color of the preparation
b. To reduce the sharpness or intensity of the herbs
c. To improve aroma
d. To increase the quantity of the preparation

59. What is the typical ratio of herb, milk, and water in Kshira Paka as per Bhaishajya Ratnavali?
a. 1:2:2 b. 1:8:8
c. 1:10:10 d. 1:15:15

60. Which condition is treated using Arjuna Kshira Paka?
a. Kasa (Cough)
b. Hridroga (Heart disease)
c. Gulma (Abdominal tumor)
d. Shotha (Inflammation)

61. What is the source of Laksha in Ayurveda?
a. Leaves of Banyan tree
b. Resinous exudation from branches of certain trees
c. Roots of Pipal tree
d. Bark of Croton tree

62. Which insect interaction is essential for the formation of Laksha?
a. Insects feed on the tree roots
b. Male insects secrete the resin
c. Females lay eggs and secrete the resin after their death
d. Insects chew the bark and excrete the resin

63. What is the traditional method used to purify Laksha?
a. Filtering through a sieve only once
b. Heating over a high flame
c. Filtering the liquid 21 times through a cloth
d. Fermenting for 30 days

64. What is the main indication for using Laksha Rasa in Ayurveda?
a. Jvara (fever)
b. Pradara (excessive menstrual bleeding)
c. Aruchi (loss of appetite)
d. Kasa (cough)

65. What is the shelf life of Laksha Rasa after preparation?
a. 6 months b. 1 year
c. 1 week d. Instant use

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c. 1 week d. Instant use

71. What is Mamsa Rasa in Ayurveda?
a. A soup made by boiling vegetables with water.
b. A soup prepared by boiling chopped meat with water.

c. A juice extracted from fruit pulp.
d. A spicy broth with grains and lentils.

72. Which type of Mamsa Rasa involves cooking the meat without adding any spices or sneha (oil/ghee)?
a. Krita Mamsa Rasa b. Tanu Mamsa Rasa
c. Akrita Mamsa Rasa d. Ghana Mamsa Rasa

73. Which of the following ingredients is added to the Mamsa Rasa during the frying process in the preparation method?
a. Ghrita and Haridra b. Jiraka and Lavana
c. Sneha and Mircha d. Lavana and Sunthi

74. What is the primary principle involved in the preparation of Mamsa Rasa?
a. Sneha Samskara
b. Agni-Agni Samskara
c. Toya-Agni Samskara
d. Ushna Samskara

75. What is the shelf life of Mamsa Rasa after preparation?
a. 1 day b. 1 week
c. 6 months d. Instant use

76. What is the definition of Mantha according to the classical Ayurvedic texts?
a. A preparation with a thick consistency
b. A preparation with a medium consistency
c. A preparation with a thin consistency
d. A preparation without any consistency

77. What is the principle used in the preparation of Mantha?
a. Sneha Samskara b. Agni Samskara
c. Toya-Agni Samskara d. Kshira Samskara

78. In the general method of preparation of Mantha, what is the quantity of water added to the herbal powder?
a. 2 times the amount of herbal powder
b. 4 times the amount of herbal powder
c. 6 times the amount of herbal powder
d. 8 times the amount of herbal powder

79. Which of the following is NOT an ingredient in the preparation of Kharjuradi Mantha?
a. Khajura b. Dadima
c. Munnaka d. Shunthi

80. What is the therapeutic indication of Kharjuradi Mantha?
a. Hridroga
b. Gulma
c. Madhatya (alcohol intoxication)
d. Agnimandya

81. Udaka Kalpana is a sub-type (upakalpana) of which Ayurvedic preparation?
a. Kvatha Kalpana b. Svarasa Kalpana
c. Hima Kalpana d. Sneha Kalpana

82. What is the general ratio of water to the drug (e.g., rice) used in Udaka Kalpana?
a. 2 times the amount of the drug
b. 4 times the amount of the drug
c. 6 times the amount of the drug
d. 8 times the amount of the drug

83. Which of the following is commonly used as Prakshepa Dravya in Udaka Kalpana?
a. Salt b. Ghee
c. Sugar and Honey d. Mustard oil

84. What is the main principle behind Udaka Kalpana preparation?
a. Toya Samskara b. Agni Samskara
c. Sneha Samskara d. Kshara Samskara

85. Which of the following is an example of Udaka Kalpana?
a. Tandulodaka b. Shadanga Paniya
c. Panchagavya d. Takra

86. Panaka Kalpana is particularly suitable for which of the following?
a. Juicy fruits
b. Fruits that are unripe or difficult to extract juice from
c. Overripe fruits
d. Vegetables

87. Which of the following fruits is commonly used in Panaka preparation?
a. Pineapple b. Mango
c. Tamarind d. All of the above

88. In Panaka Kalpana, after extracting the fruit juice, how many times the amount of cold water is added to the juice?
a. 4 times b. 8 times
c. 16 times d. 10 times

89. Which ingredient is added to enhance the taste of Panaka?
a. Salt and Jiraka b. Honey and Sugar
c. Ghee and Oil d. Butter and Milk

90. What is the therapeutic use of Chincha Panaka as mentioned in the text?
a. Used to treat Atisara (diarrhea).
b. Used to t reat Agnimandya (digestive fire weakness) and Ajirna (indigestion)

c. Used to treat Jvara (fever)
d. Used to treat Raktapitta (bleeding disorders)

91. What is Arka Kalpana primarily used for in Ayurvedic practice?
a. To prepare solid herbal formulations
b. To extract volatile constituents of medicinal drugs.
c. To create powdered herbal medications
d. To prepare fresh juices

92. Which of the following herbs is commonly used in the preparation of Arka?
a. Tulasi
b. Gulaba Pushpa (Rose petals)
c. Ashvagandha
d. Ginger

93. In the Arka preparation method, what is the purpose of soaking the drugs overnight?
a. To enhance the flavor
b. To soften the drugs for easier extraction of volatile principles
c. To increase the quantity of the final product
d. To reduce preparation time

94. What is a key characteristic of the final Arka distillate?
a. It should be cloudy and thick
b. It should have a strong, unpleasant odor
c. It should be clear, transparent, and fragrant
d. It should be sticky and viscous

95. How long can Arka be stored for effective use?
a. 3 months b. 6 months
c. 1 year d. 2 years

Answer Sheet

1.	C.	2.	B.	3.	B.	4.	C.	5.	A.	6.	D.	7.	C.	8.	B.
9.	B.	10.	B.	11.	B.	12.	A.	13.	A.	14.	C.	15.	C.	16.	D.
17.	B.	18.	B.	19.	C.	20.	B.	21.	B.	22.	B.	23.	C.	24.	C.
25.	D.	26.	B.	27.	C.	28.	A.	29.	A.	30.	B.	31.	B.	32.	D.
33.	C.	34.	B.	35.	B.	36.	A.	37.	B.	38.	C.	39.	A.	40.	B.
41.	B.	42.	A.	43.	B.	44.	A.	45.	B.	46.	B.	47.	C.	48.	C.
49.	B.	50.	B.	51.	B.	52.	C.	53.	D.	54.	C.	55.	A.	56.	B.
57.	B.	58.	B.	59.	B.	60.	B.	61.	B.	62.	C.	63.	C.	64.	B.
65.	D.	66.	B.	67.	C.	68.	C.	69.	B.	70.	D.	71	B.	72	C.
73.	A.	74.	C.	75.	D.	76.	B.	77.	C.	78.	B.	79.	D.	80.	C.
81.	C.	82.	D.	83.	C.	84.	A.	85.	A.	86.	B.	87.	D.	88.	C.
89.	B.	90.	B.	91.	B.	92.	B.	93.	B.	94.	C.	95.	C.		

Write Short Question

1. What are the five primary dosage forms classified under Panchavidha Kashaya Kalpana?
2. List suitable examples of each type of Upakalpana derived from Kvatha and explain their specific uses.
3. What are the reference ingredients commonly used in the preparation of Svarasa, and how is it prepared?
4. Describe the method of preparation for Kalka, including the quantity of ingredients typically used.
5. Explain the principle involved in the preparation of Kvatha and its significance in Ayurveda.
6. What instruments are essential for the small and large-scale production of Hima Kalpana, and how do they differ?
7. Define Siddhi Lakshana and explain its importance in evaluating the quality of Ayurvedic preparations.
8. What are the recommended storage conditions and shelf life for Phanta Kalpana?
9. Discuss the modern aspects of preparation related to Pramathya Kalpana and how they compare to traditional methods.
10. What are the therapeutic benefits of Mamsa Rasa and how is it prepared in the context of Upakalpana?

Write Long Question

1. Describe the five primary dosage forms of Panchavidha Kashaya Kalpana (Svarasa, Kalka, Kvatha, Hima, and Phanta) in detail, including their definitions, preparation methods, ingredients, and therapeutic uses.
2. Explain the preparation of Kalka as part of Churna Kalpana, detailing the reference ingredients, quantities, method, and principles behind its therapeutic effects.
3. Analyze the preparation and significance of Kvatha in Ayurveda, covering the method, ingredients, quantities, tools required, and its role in holistic healing.
4. Discuss the forms of Hima Kalpana (Mantha Kalpana, Udaka Kalpana, and Panaka Kalpana), including their preparation methods, ingredients, and therapeutic properties.
5. Evaluate modern preparations of Upakalpana (e.g., Pramathya Kalpana, Paniya Kalpana, Ushnodaka, and Kshira Paka Kalpana), comparing traditional methods with contemporary advancements and their relevance in today's healthcare.

• • •

7 Kalpana Nirmana - II

• Lecture: 5 hours, non-lecture: 4 hour • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- Yes) •

Avaleha

Introduction

- Avaleha Kalpana is a semi-solid formulation prepared by adding jaggery (guda), sugar (sharkara), or sugar candy to herbal juices or decoctions, which are then boiled together.
- **लिह्यते अनेन इति लेहः ।।** (Shabdakalpadruma)
- The word Avalehya has been originated from the Lih is dhatu + Ashvandane is kriya that means the substance which is taken by licking.
- It is the upakalpana of kvatha kalpana.
- Avaleha can be likened to the concept of confections or electuaries in the British Pharmacopoeia, where large quantities of insoluble powders are made palatable by blending them into a paste with sugar, syrup, or honey.
- This traditional Ayurvedic preparation serves as a therapeutic medium to administer medicinal herbs in a flavorful and effective manner.

Synonyms

Leha, Rasakriya, Lehya, Avalehya and Avaleha.

References

Vedic Period: Initially termed as Haviprasha Kalpana.

Samhita Period

- **Charaka Samhita**:
  - **Sutra Sthana 1** : Snehavicharana (oleation)
  - **Sharira Sthana** : Shishuprashana Vidhi (infant feeding)
  - **Chikitsa Sthana**: Rasayana and Vyadhi Pratighata.
  - **Kalpa Sthana**: 60 Avaleha yogas specified.
  - **Siddhi Sthana**: Use in Panchakarma
- **Sushruta Samhita**:
  - This also finds a place in the Sutra, Sharira, Chikitsa, Kalpa, and Uttara Sthanas.
- **Ashtanga Hridaya**:
  - As described in Sutra, Sharira, Kalpa, Chikitsa Sthana, and Uttaratantra.
- **Sharngadhara Samhita**:
  - In the 8th chapter of Madhyama Khanda, Ava-leha Kalpana is discussed in detail, covering the preparation methods, proportions, uses, and Siddhi Lakshana.

Definition

क्वाथादीनां पुनः पाकाद् घनत्वं सा रसक्रिया।
सोऽवलेह्यश्च लेहः स्यात्तन्मात्रा स्यात्पलोन्मिता।।

(Sha.S.M.Kh. 8/1)

Avaleha Kalpana is a formulation method in which a liquid preparation, such as Kvatha, is boiled and reduced over a mild fire to obtain a thicker drug mass. This thicker mass, when mixed with sweet substances (Madhura Dravya), medicinal drugs (Aushadha Dravya), and other ingredients specific to Avaleha preparation, forms a semi-solid confection known as Avaleha. The general dosage for internal administration of Avaleha Kalpana is traditionally one Pala, equivalent to 48 grams.

Essential ingredients and Equipments

1. **Drava Dravya**: Kvatha, Svarasa, Phanta, etc.
2. **Madhura Dravya**: Sharkara, Guda, Khanda, Matsyandika, etc.

3. **Prakshepa Dravya**: Powders of Medicinal Dravyas
4. **Ghrita and Madhu**: As per mentioned in preparation.
5. **Vessel**:
   - During Process –
     - Loha Patra - Bhallatakavaleha
     - Tamra Patra - Brahma Rasayana
   - Rajata Patra - Amritaprashavaleha
   - Storage:
   - Madana Kameshwara Modaka - store in wooden jars (wood of ketaki, jaati etc.)

General method of Preparation

1. Initiate by preparing the liquid component, such as kashaya (decoction), svarasa (fresh juice), or any other liquid as per classical references.
2. In a clean stainless steel vessel, dissolve the sweetening agents like 'guda' (jaggery), sharkara (sugar), or khanda sharkara (crystal sugar) in the prepared liquid. Use mild heat to melt the sweeteners evenly.
3. Filter the liquid blend through a clean cloth to remove any physical impurities from the sweetening agents.
4. Boil the filtered liquid again over mild heat until it reduces to a thicker consistency, typically reaching the stage where it forms 1 to 2 threads when stretched between fingers.
5. Just before the mixture reaches the final cooking stage (known as Paka lakshana or Asanna paka lakshana), add ghee to the preparation and mix well.
6. Once the Avaleha paka lakshana (indication of proper consistency for avaleha) is achieved, remove the vessel from the heat. Gradually add fine medicinal powders to the mixture, stirring continuously to form a smooth, uniform blend.
7. After the mixture has completely cooled, add honey and mix thoroughly.
8. Pack the prepared avaleha in clean, dry, airtight containers with wide mouths, and store it in a cool, dry place.

Specific Rules of Avaleha Preparation

Rule No. 01 - Anukta Mana

सिता चतुर्गुणा कार्या चूर्णाच्च द्विगुणो गुडः।
द्रवं चतुर्गुणं दद्यात् इति सर्वत्र निश्चयः।। (Sha.S.M.Kh. 8/2)

Anukta (Unstated), means certain ingredients or steps might not be clearly listed, but they can be figured out based on the context or general rules.

NOTE : It should be measured based on the quantity of Churna.

Sr. No.	Dravya	Proportion
1.	Sita	4 Parts
2.	Guda	2 Parts
3.	Drava	4 Parts

Rule No. - 02

प्रायो न पाकश्चूर्णानां भूरिचूर्णस्य तेन हि।
चासन्नपाके प्रक्षेपः स्वल्पस्य पाकमागते।।

(Dra.Gu.Vi.U. 2/58)

1. Powders (churna) are not cooked directly on the fire.
2. For mixing powder into syrup (chashani), first, turn off the heat.
3. Stir continuously with a ladle and add the powder gradually.
4. Ensure the syrup remains slightly wet to allow the powder to blend well.
5. The powder should be very fine to mix properly into the Avaleha.
6. If honey is added, mix it only after the Avaleha has completely cooled.
7. When making Avaleha solely with honey, gently heat the honey in an earthen vessel until it becomes slightly thinner.
8. Strain the honey through a clean cloth before adding the powder.
9. Store Avaleha in a glass container since glass is inert and won't react with the contents.

Importance of Temperature

Temperature plays a very important role during different phases of its preparation and preservation.

1. **Preservation of Potency:** The temperature is crucial to maintaining the strength in herbs. The essential elements from herbs heat up with specific temperatures but less of it at the right temp, or too high a temperature and you kill the properties within those herbs.
2. **Uniform Texture and Paka Lakshana:** The desired consistency called Paka Lakshana is achieved only at the proper temperature. This mixture needs to be gently heated through to reduce it

quite thick but without burning or overcooking. While preparing Avaleha, the mixture is slowly cooked over a gentle flame so that it attains the correct texture (1-2 threads consistency) without losing its therapeutic qualities.

3. **Ghee & Honey Addition:** Ghee is added in the last stages before reaching Asanna Paka lakshana stage, so that it incorporates well. Ayurveda says that complete cooling should be observed, and honey should not be added at a very high temperature since heated substances absorb contents to the maximum, which could even become toxic in the case of adding honey this way.
4. **Preventing Alterations in Physical Properties of Ingredients:** By controlling the temperature, it is possible to avoid caramelization of the sweetening agents (like jaggery or sugar), which would change the flavor, texture, and sometimes even medicinal content of the final product.
5. **Preservation and Storage:** Avaleha should be stored under cool, dry conditions to prevent them from fermenting and spoiling. Over time, with prolonged storage, exposure to heat can change the consistency and spoil the preparation.

Therefore, temperature control is essential to the preparation of Avaleha at every stage to maintain its efficiency, uniformity, and shelf life.

Siddhi Lakshana

सुपक्वे तन्तुमत्त्वं स्याद् अवलेहोऽप्सुमज्जति।
स्थिरत्वं पीडिते मुद्रा-गन्ध-वर्ण-रसोद्भवः।।

(Sha.S.M.Kh. 8/3)

1. **Tantumattva (Thready Consistency):** During the cooking process, as the liquid thickens, a small portion of the paka material is taken between the thumb and index finger. When pressed and then released, the number of threads that form is observed. For Avaleha preparation, a 1 to 2 thread consistency is ideal, while Khanda Paka requires a thicker consistency with 3 to 4 threads.
2. **Apsumajjati (Sinking in Water):** To assess the readiness of the thickened paka material, a small portion is placed in a bowl of stable water. The preparation is complete if the material sinks and settles at the bottom, indicating proper consistency.
3. **Kharatva/Sthiratva (Roughness and Stability):** Once the preparation is finished, a small portion is rubbed between the thumb and index finger. The rough texture (kharatva) signifies the fine medicinal powders that have been incorporated, while its firmness (sthiratva) confirms the stability of the final product.
4. **Anguli Mudra (Impression Test):** When pressed between fingers, the end product should retain the distinct imprint of the fingers. This is a sign of an ideal and correctly prepared formulation.
5. **Gandha, Varna, and Rasodbhava (Smell, Color, and Taste):** The final checks include evaluating the color, fragrance, and taste of the preparation. These sensory qualities should reflect the purity and potency of the medicinal ingredients used, ensuring the product's authenticity and effectiveness.

Dose

Sharngadhara Samhita- 1 Pala (48 gms)
Acharya Yadav Ji Trikam Ji- 1 Karsha (12 gms)
Todarananda: - 2 Pala (96 gms)

Sevana Kala

ऊर्ध्वजत्रुरोगघ्नी सायं स्यादवलेहिका।
अधोरोगहरी या तु सा पूर्वं भोजनान्मता।। (B.R., Jvara 5/131)

If a patient is experiencing a condition in the Urdhvajatrugata region, it is advisable to administer Avalehya in the evening (sayamkala) along with an appropriate anupana. Conversely, if the ailment affects the Adhobhaga, taking the leha before meals is recommended, as stated in Bhaishajyaratnavali.

Shelf Life

1. According to Sharngadhara Samhita- 1 year
2. According to Yoga Ratnakara- 6 months
3. According to Gazzet of Governament of India 2016- 3 Years.

Vasavaleha

Reference

AFI, Part- 01

वासकस्वरसप्रस्थे सितामष्टपलोन्मिताम्।
सर्पिषो द्विपलं दत्त्वा पिप्पलीद्विपलं तथा।।
पचेल्लेहत्वमायाते शीते मधु पलाष्टकम्।
दत्त्वावतारयेद्वैद्यो मात्रया लेह उत्तमः।।
निहन्ति राजयक्ष्माणं कासं श्वासं सुदारुणम्।
पार्श्वशूलञ्च हृच्छूलं रक्तपित्तज्वरं तथा।।

(B.R., Rajyaksma. 14/82-84)

Ingredients Used

Drug Name	Part Used	Proportion
Vasa Svarasa	Lf.	768 gms
Sita	–	384 gms
Go Ghrita	–	96 gms
Pippali	Fr.	96 gms
Madhu	–	384 gms

Procedure

1. Collect Vasa leaves and chop them into small pieces.
2. Place the chopped leaves in a wide-mouthed jar and add 16 parts of water.
3. Boil the mixture until it is reduced to one-quarter of its original volume.
4. Strain the boiled mixture to obtain the Vasa Kashaya (decoction).
5. Add sugar to the filtered Kashaya and heat until a semi-solid consistency is reached.
6. As the mixture approaches a semi-solid state, add ghee and continue heating.
7. Once the semi-solid consistency is fully achieved, remove the mixture from heat.
8. While cooling, add long pepper powder and mix thoroughly.
9. After the mixture has completely cooled, add honey and mix well to finalize the preparation.

Dose: 6 – 12gms

Anupana: Milk, Water

Therapeutic Indications: Kasa, Shvasa, Jvara, Raktapitta, Rajayakshma, Prashva Srila, Hridshula

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pharmaceutical Development of Granules of Vasa Avaleha	Ankit Mansukhbhai Paneliya, Institute for Post Graduate Teaching and Research in Ayurveda, Jamangar, Gujrata.	To achieve the ideal composition for Vasa avaleha granules, adhering strictly to classical proportions is impractical. Adjustments in the quantities of Sharkara, Go-ghrita, and Madhu are necessary for their preparation. Doubling the amount of Sharkara and reducing Madhu to one-fifth fulfilled all desired characteristics, including fragrance, palatability, and appearance. Therefore, this adjusted ratio can be deemed as the standard for granule preparation.
2.	Efficacy of Vasa Avaleha and its granules on Tamaka Shwasa (bronchial asthma): Open-label Randomized Clinical Study	Ankit M. Paneliya	In a study of 66 patients randomly divided into Groups A and B, VA and GVA were administered at 6 g twice daily with lukewarm water for 28 days. Follow-up after 14 days revealed significant improvements in symptoms, pulmonary function, and quality of life. Both treatments demonstrated increased peak expiratory flow rate, decreased eosinophil count, and improved breath holding time. Notably, there was reduced dependence on modern emergency drugs and fewer asthma attacks. This underscores the efficacy of traditional herbal formulations in managing bronchial asthma, either alone or in combination with modern drugs.
3.	A Comparative Study of the effect of Vasa Avaleha prepared with Vasa Svarasa and Vasa Kvatha in Tamaka Shwasa	Ankit Gupta, Ph.D. Scholar, Department of Rasa Shastra & Bhaishajya Kalpana Institute for Post Graduate Teaching & Research Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat.	The study aimed to compare the efficacy of two types of Vasa Avaleha, one prepared with 'Svarasa' and the other with 'Kvatha' of Vasa. Thirty-five patients participated, showing significant improvement in cardinal symptoms such as dyspnea, coughing, and rhinitis, with the Svarasa group exhibiting the highest percentage of improvement. Hematological parameters showed a slight decrease in values across both groups, with no statistical significance. Overall, Vasa Avaleha (Svarasa) demonstrated superior effectiveness compared to the Kvatha group.
4.	Pharmacognostical and Pharmaceutical Evaluation of Vasa Avaleha – An Ayurvedic Compound	Suhas A Chaudhary, Lecturer, Dept. of Kaumarbhritya, Shri Gulabkunverba Ayurved Mahavidyalaya. Gujarat Ayurveda University, Jamnagar, Gujarat-361008 India.	The study aimed to standardize the finished product VA to ensure its identity, quality, and purity. Pharmacognostical analysis revealed the presence of various microscopic features from Adhatoda Vasica Nees leaves and Piper longum Linn fruits. Organoleptic characteristics of the VA complied with standard specifications. VA exhibited a pH value of 5.5, a water-soluble extract of 70% w/w, a loss on drying of 19.18% w/w, and a reducing sugar content of 29.90% w/w. High Performance Thin Layer Chromatography (HPTLC) at 254nm and 366nm detected 8 and 4 spots, respectively.
5.	Pharmaceutical Standardization of Vasa Avaleha and Vasa Ghanavati	Hansraj V. Barjod, D final year, Dept. of R.S. & B.K., J.S. Ayurveda Mahavidyalaya, Nadiad Gujarat, 387001.	Colour - Dark Green Odour- Characteristic Taste - Katu Madhura pH (10% aqueous solution)- 6.28%w/w Ash Value % w/w - 1.5 % w/w Acid-insoluble Ash value % w/w - 0 % w/w Alcohol soluble extractive value % v/w - 55.2 % v/w Water soluble extractive value % v/w - 67.2 % v/w Loss on Drying % - 10 % Consistency - Semi Solid Sugar Content total - 65.41 % w/w Reducing 30.45 % w/w

Kushmanda Avaleha

Reference

AFI, Part- 01

कूष्माण्डकात्पलशतं सुस्विन्नं निष्कुलीकृतम्।
पचेत्तप्ते घृतप्रस्थे शनैस्ताम्रमये दृढे।।
यदा मधुनिभः पाकस्तदा खण्डशतं न्यसेत्।
पिप्पलीशृङ्गवेराभ्यां द्वे पले जीरकस्य च।।
त्वगेलापत्रमरिचधान्यकानां पलार्द्धकम्।
न्यसेच्चूर्णीकृतं तत्तु दर्व्या सङ्घट्टयेत्पुनः।।
तत्पक्वं स्थापयेद् भाण्डे दत्त्वा क्षौद्रं घृतार्द्धकम्।
तद्यथाग्निबलं खादेदूर्ध्वपित्ती क्षतक्षयी।।
कासश्वासतमश्छर्दितृष्णाज्वरनिपीडितः।
वृष्यं पुनर्नवकरं बलवर्णप्रसादनम्।।
उरःसन्धानकरणं बृंहणं स्वरशोधनम्।
अश्विभ्यां निर्मितं श्रेष्ठं कूष्माण्डकरसायनम्।।
खण्डामलकमानानुसारात् कूष्माण्डकदूवात्।
पात्रं पाकाय दातव्यं यावान्वात्र रसो भवेत्।।

(B.R., Raktpitt. 13/95-101)

Ingredients Used

Drug Name	Part Used	Proportion
Kushmanda	Fr.	4.800 kg
Ghrita	–	768 gms
Khanda	–	4.800 kg
Pippali	Fr.	96 gms
Shunthi	Rz.	96 gms
Shveta Jiraka	Fr.	96 gms
Tvak	St. Bk.	24 gms
Ela	Sd.	24 gms
Patra	Lf.	24 gms
Maricha	Fr.	24 gms
Dhanya	Fr.	24 gms
Madhu	–	384 gms

Procedure

1. Cut the Kushmanda into pieces, removing the skin and seeds.
2. Boil the pieces in a small quantity of water and squeeze them to obtain the juice.
3. Fry the remaining pulp in ghee until it is properly cooked.
4. Add the juice to the fried pulp, along with sugar, and heat the mixture to a semi-solid consistency.
5. Incorporate the fine powders of ingredients, such as Pippali (long pepper) to Coriander, into the mixture and mix thoroughly to achieve a homogeneous consistency.
6. Allow the mixture to cool down and then add honey, blending it well.
7. Store the final preparation in tightly sealed containers to maintain its quality.

Dose: 6- 12 gms

Anupana: Water, Milk

Therapeutic Indications: Kasa, Shvasa, Urahkshata, Kshaya, Puranajvara, Raktapitta, Chhardi, Trishna, Jvara, Shukra Kshaya, Daurbalya, Karshya, Svarbedha, Vaivarnya.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Exploring Potential of Kushmanda Avaleha in Respiratory Illness – A Comprehensive Review	Sheetal Sharma, Department of Rasashastra and Bhaishajya Kalpana, All India Institute of Ayurveda, Sarita Vihar, New Delhi - 110 076, India. E-mail: ssheetal904@gmail.com	Based on a synthesis of literature from both traditional texts and scientific journals, Kushmanda Avaleha, a polyherbal formulation, demonstrates varied quantities of its constituents and exhibits pharmacological properties with therapeutic efficacy, particularly in addressing respiratory ailments. It serves as a comprehensive treatment option for respiratory disorders.

Sr. No.	Article Name	Author Name	Result
2.	Evaluation of Nutritive Value of Kushmanda Avaleha	Adhave Swati Sheshrao, PG Scholar, Depart. of RSBK, Government Ayurved College Nanded, Maharashtra, India.	Kushmanda Avaleha comprises 4.44% fats, 1.05% proteins, and 82.10% carbohydrates. Additionally, it contains 60mg/100gm of sodium and 11mg/100gm of zinc, providing 372Kcals/100gm of energy to the body.
3.	Nutraceutical Value of Kushmanda Avaleha and its Importance for Children's Health and Growth: A Review Article	Mukta Bariha, Department of Kaumarabhritya, Shri Narayan Prasad Awasthi, Government Ayurved College, Raipur, Chhattisgarh, India.	Kushmanda Avaleha, for all ages, fights weakness post-illness, acting as a tonic and Amlapitta remedy by reducing Pitta. Bhavmishra notes its memory-enhancing properties. With nutrients aiding weight gain, nourishment, and immunity, it's endorsed for overall nourishment, strength, and weight gain by Acharyas, offering holistic benefits.
4.	An Clinical Study on Khanda Kushmanda Avleha and Narikela Avaleha in the Management of Amlapitta	Dr. Pradeep Gupta, PG Scholar, Dept. of Kayachikitsa, Major S.D. Singh P.G. Ayurvedic Medical College & Hospital, Bewar Road, Farrukhabad, UP	Statistical analysis favored Kushmanda Khanda over Narikela Khanda. Both had positive effects, with no adverse reactions, highlighting Ayurveda's safety. Emphasizing healthy habits and prevention, including diet, exercise, and mindfulness practices, is crucial for a healthier life.
5.	Pharmaceutical Modification of Kushmandavaleha into Candy	Dr Akshatha, Ashwini Ayurvedic Medical College & PG Centre Davangere, Karnataka	Due to its high water content, Kushmanda experienced a 90% loss during fruit pulp collection. Water-soluble extractives outweighed alcohol-soluble ones. Microbial load remained within acceptable limits. The avaleha was mixed with sugar syrup and molded into candies of various shapes, with a pleasant taste observed.
6.	Pharmaceutico Analytical Profile of Kushmanda Avaleha and Its Modified Dosage Form as Kushmanda Granules	Dr. Neha Sudarshann Chavhan, Deparment of Rasashastra and Bhaishajya Kalpana, Mahatma Gandhi Ayurveda College Hospital and Research Centre, Wardha 442001, Maharashtra, India	The study reports Avaleha's parameters: Loss on drying at 105°C, total ash, acid-insoluble ash, alcohol-soluble extractives, water-soluble extractives, pH, total sugar, reducing sugar, nonreducing sugar, and total fat and moisture content in the range of 2.3%, 0.7%, 0.103%, 71.22%, 77.12%, 4.2%, 78.15%, 68.21%, 5.6%, and 2.92%, respectively. For granules, the range is 3.1%, 1.2%, 0.36%, 38.09%, 41.2%, 3.53, 80.17, 78.12, 4.5, 0.92, and 3.12, respectively.

Research Updates on Avaleha Kalpana

Sr. No.	Article Name	Author Name	Result
1.	Avaleha Kalpana (Medicated Semisolid Preparation) : An Synoptic Overview	Jaswinder Kaur, School of Pharmaceutical Sciences, Lovely Professional University, Jalandhar - Delhi G.T. Road, Phagwara, Punjab –144411 (India)	Avaleha Kalpana, an important Ayurvedic preparation, is gaining popularity for its ease of use and palatability. It serves as a nutraceutical in Ayurveda, combining medicinal herbs with jaggery, sugar, honey, ghee, oil, and milk, providing proteins, carbohydrates, fats, minerals, vitamins, and active pharmacological compounds. However, it should not be equated with functional foods or dietary supplements.
2.	Critical Review On Avaleha Kalpana And Its Different Dosage Forms	Abdul Kabeer V. M, Department of PG studies in Rasashastra and Bhaishajya Kalpana, Alva's Ayurveda Medical College, Moodbidri, Karnataka, India.	This study provides a detailed description of Avaleha, covering its various dosage forms, confirmatory tests, and a modern review of Avaleha Kalpana.

Market Survey

1. Clear Objective:

- The objective is well-defined: to evaluate demand, preferences, and market potential. This will allow for a targeted approach to gathering relevant data for product development and marketing strategies.

2. Target Audience Segmentation:

- Segmenting the audience into Consumers, Healthcare Practitioners, Retailers, and Manufacturers is essential. Each group provides a different perspective on Avaleha Kalpana, which will enrich the overall analysis. Each of these sectors plays a crucial role in the product's lifecycle—from creation to end-user adoption.

3. Survey Questions:

- **For Consumers:**
  - These questions are aimed at assessing awareness, usage, preferences, and satis-faction. By asking about specific Avaleha products (e.g., Chyavanaprasha, Kushmanda Avaleha), you gather valuable insights on consumer behavior.
  - Asking about factors such as taste, packaging, and purchase drivers helps identify key aspects that influence consumer choices.
  - Satisfaction-related questions provide feedback for improvement, which is critical for product refinement.
- **For Healthcare Practitioners:**
  - Questions here focus on understanding clinical applications, efficacy, and preferences of Ayurvedic doctors. Since healthcare practitioners often recommend Avaleha, this feedback is important for manufacturers to align product benefits with medical uses.
  - Including questions about modern scientific studies gives insight into whether there's a demand for more scientifically backed Avaleha formulations.
- **For Retailers:**
  - Retailers provide the bridge between consumers and manufacturers. Knowing what sells well, price ranges, and customer packaging preferences helps shape distribution strategies and sales.
  - Understanding which brands dominate (Dabur, Baidyanath, Zandu, etc.) allows for competitive analysis.
- **For Manufacturers:**
  - These questions delve into the chal lenges of production and innovations. Exploring issues like ingredient sourcing, shelf life, and taste enhances understanding of production difficulties and areas for technological or procedural improvements.
  - Asking about innovations allows identification of new trends and developments (e.g., sugar-free or organic versions of Avaleha).

4. Analysis Areas:

- **Market Size & Growth:**
  - Crucial for understanding the business viability of entering or expanding in the Avaleha market. Growth rates indicate future opportunities.
- **Consumer Behaviour:**
  - This area will provide insights into the frequency of product use, preferred formulations, and unmet needs, which is important for customizing product offerings.
- **Competition:**
  - Identifying key competitors and their market share helps shape pricing, marketing, and positioning strategies.
- **Trends:**
  - Tracking trends such as organic formulations or sugar-free options is crucial for staying competitive and catering to health-conscious consumers.

5. Data Collection Methods:

- A mix of surveys, interviews, and focus groups will help gather both quantitative and qualitative data, ensuring a well-rounded understanding of market dynamics.

6. Expected Outcomes:

- This section clearly outlines the goals of the survey, from gauging consumer awareness to identifying challenges for manufacturers and retailers. The survey results will allow businesses to make informed decisions in terms of product innovation, marketing strategies, and distribution channels.

Sneha Kalpana

Introduction

- Sneha Kalpana is a specialized Ayurvedic pharmaceutical process that involves the preparation of medicated fatty substances.
- The term "Sneha" refers to fats or oily materials, such as ghee or oils, while "Kalpana" signifies the method of formulation.
- This process is used to infuse therapeutic herbs into a fatty base, making it an integral part of Ayurveda for creating potent, easily absorbable medicines.

- Sneha (fatty substances) in Ayurveda is derived from two sources:
  - **Sthavara Yoni (plant-based)**: Examples include Tila (sesame), Sarshapa (mustard), Eranda (castor), Atasi (flaxseed), and Karanja.
  - **Jangama Yoni (animal-based)**: Examples include cow, buffalo, sheep, and goat.

There are four types of Sneha:

सर्पिस्तैलं वसा मज्जा सर्वस्नेहोत्तमा मताः।
एषु चैवोत्तमं सर्पिः संस्कारस्यानुवर्तनात्।। (Ch.Su. 13/13)

- Ghrita (ghee)
- Taila (oil)
- Vasa (muscle fat)
- Majja (bone marrow)

- Ghrita as the Best Sneha–
  - Ghrita is considered the superior Sneha Dravya (fatty substance) due to its ability to assimilate and retain the properties of the substances it is processed with.
  - **Scholarly View:** Ghrita is unique in that it preserves its inherent qualities, such as sneha (unctuousness) and sita (cooling), while also carrying the properties of the herbs used in its processing. On the other hand, Taila (oil) tends to lose some of its original properties when processed with medicinal drugs.

Aims of Sneha Kalpana

1. ***To extract lipid-soluble active principles from the drugs:*** Sneha Kalpana involves the use of oils or ghee as the medium for extracting active ingredients from herbs. Many medicinal plants contain lipid-soluble compounds that are more effectively extracted in fats compared to water. This process helps ensure the full therapeutic potential of the herbs is captured.
2. ***To make use of the therapeutic values of oil/ghee:*** Oils (taila) and ghee (ghrita) themselves have therapeutic properties, such as nourishing tissues, improving digestion, and balancing doshas (especially Vata and Pitta). These mediums not only serve as carriers for the herbal extracts but also contribute their own health benefits.
3. ***To enhance the shelf life of sneha preparation:*** Sneha Kalpana improves the shelf life of Ayurvedic preparations. Oil and ghee act as preservatives, protecting the preparation from microbial growth and oxidation, thus ensuring that the medicinal qualities are retained over time.
4. **To enhance drug absorption:** Fat-based formulations improve the bioavailability of the active components in the herbs. Lipid-soluble compounds can be more readily absorbed by the body when delivered in oil or ghee, promoting better therapeutic efficacy.
5. **To make the preparation more palatable and pleasing with good odour:** Ghee and oils have a naturally pleasant taste and aroma, which makes the final product more appealing and easier to consume. This helps in ensuring patient compliance, especially when the medicine needs to be taken for an extended period.

Definition

Sneha Kalpana is a process in which medicated oils or ghee are prepared by boiling the lipid base with herbal decoctions (Kashaya) and fine herbal paste (Kalka) according to specific formulations. This method ensures the infusion and absorption of the active therapeutic properties of the medicinal ingredients into the oil or ghee.

References

a. **Charaka Samhita**: Understanding Sneha includes knowing its types, sources, and properties, along with its preparation methods. The proportions and signs of proper preparation (Siddhilakshana) are key in Sneha Kalpana. Charaka Vimana Sthana, chapter 7, explains these signs, and various Sneha preparations are detailed there.

B. **Sushruta Samhita**: Acharya Sushruta first introduced Sneha Kashayas and detailed preparations like Satadhauta Ghrita and Sahasrapaka Taila. In Chikitsa Sthana, he described the types of Sneha, its preparation, Siddhi Lakshana, Sneha Paka stages, uses, and possible harmful effects.

C. **Sharngadhara Samhita**: In the 9th chapter of Madhyama Khanda, Sneha Kalpana is discussed in detail, covering the preparation methods, proportions, uses, types of Paka, and Sneha Siddhi Lakshana.

D. **Bhaishajya Ratnavali**: The first text to describe Sneha Murchchhana also elaborates on the method of preparing Sneha Kalpana.

E. **Sahasra Yoga**: The text elaborates on the ratios and various Ghrita and Taila preparations, listing 135 types of Ghritas and 96 types of Tailas.

Essential Ingredients and Equipments

1. **Drava Dravya:** The liquid component (Drava Dravya) is taken in a volume four times that of the Sneha Dravya. This liquid may be water, other natural fluids, or any liquid medicinal preparation depending on the formulation.
2. **Sneha Dravya:** The oil or ghee used as the base (Sneha Dravya) is taken in a quantity four times that of the Kalka Dravya. For all pharmaceutical formulations, it is essential to use pre-processed (Murchchhita) oil or ghee.
3. **Kalka Dravya:** When using fresh or moist herbs, the Kalka (herbal paste) is prepared by pounding them in a Khalva Yantra (mortar and pestle). For dried herbs, a fine powder is made and then triturated with the appropriate amount of water to form a smooth paste.
4. **Patra:** The vessels used are made of copper, iron, earthenware, or stainless steel, internally coated with tin. They have a broad base, shallow depth, and a wide mouth.

General Method of Preparation

कल्काच्चतुर्गुणीकृत्य घृतं वा तैलमेव वा।
चतुर्गुणे द्रवे साध्यं तस्य मात्रा पलोन्मिता।। (Sha.S.M.Kh. 9/1)

1. **Measure Ingredients**:
   - Take 1 part Kalka Dravya (herbal paste).
   - Add 4 parts Sneha Dravya (oil or ghee).
   - Add 16 parts Drava Dravya (liquid such as water, decoction, or other medicinal fluids).
2. **Mix Ingredients**:
   - Thoroughly mix the Kalka Dravya with the Sneha Dravya and Drava Dravya in a vessel.
3. **Heat the Mixture**:
   - Place the mixture over a low flame and begin the heating process, ensuring continuous stirring to prevent sticking or burning.
4. **Monitor Boiling**:
   - Gently boil the mixture while monitoring it closely. Continue stirring until the mixture reaches the proper consistency and the liquid reduces significantly.
5. **Observe Sneha-Siddhi Lakshanas**:
   - Boil until Sneha-Siddhi Lakshanas (signs of proper completion) are observed, such as:
   - Complete absorption of the liquid.
   - The Kalka separates easily and becomes non-sticky.
   - Desired aroma is achieved.
6. **Filter and Store**:
   - Once the Sneha-Siddhi Lakshanas are attained, remove the preparation from heat, filter it to remove any residual paste, and store it in a clean container for use.

Specific Rules of Sneha Preparation

Rule No. - 01

अम्बुक्वाथरसैर्यत्र पृथक् स्नेहस्य साधनम्।
कल्कस्यांशं तत्र दद्याच्चतुर्थं षष्ठमष्टमम्।। (Sha.S.M.Kh. 9/6)

Sr. No	Drava Dravya	Kalka Quantity
1.	Jala	1/4th
2.	Kvatha	1/6th
3.	Svarasa	1/8th

Rule No. - 02

दुग्धे दध्नि रसे तक्रे कल्को देयोऽष्टमांशकः।
कल्कस्य सम्यक् पाकार्थं तोयमत्र चतुर्गुणम्।।
(Sha.S.M.Kh. 9/7)

Sr. No	Drava Dravya	Kalka Quantity
1.	Godugdha, Dadhi, Mamsarasa, Takra	1/8th

For proper preparation of Sneha, four times the amount of water is also added.

Rule No. - 03

द्रवाणि यत्र स्नेहेषु पञ्चादीनि भवन्ति हि।
तत्र स्नेहसमान्याहुर्यथापूर्वं चतुर्गुणम्।। (Sha.S.M.Kh. 9/8)

1. If there are five or more Drava Dravyas (liquid ingredients), the quantity of each should be equal to the amount of Sneha (oil/ghee).
2. If there are fewer than five Drava Dravyas, the total quantity of all the Drava Dravyas should be four times the amount of Sneha.

Rule No. - 04

द्रव्येण केवलेनैव स्नेहपाको भवेद् यदि।
तत्राम्बुपिष्टः कल्कः स्याज्जलं चात्र चतुर्गुणम्।।
(Sha.S.M.Kh. 9/9)

If only Dravya (medicinal drugs) are specified for a Sneha preparation, then a Kalka (herbal paste) of those same drugs is prepared and utilized. Additionally, four times the amount of water is also added to the mixture.

Rule No. - 05

क्वाथेन केवलेनैव पाको यत्रेरितः क्वचित्।
क्वाथद्रव्यस्य कल्कोऽपि तत्र स्नेहे प्रयुज्यते।।

(Sha.S.M.Kh. 9/10)

If only Kvatha Dravya (drugs intended for decoction) is specified for a Sneha preparation, then the Kalka (herbal paste) of those same drugs is incorporated into the mixture.

Rule No. - 06

कल्कहीनस्तु यः स्नेहः स साध्यः केवले द्रवे।

(Sha.S.M.Kh. 9/11)

In cases where Kalka is either not specified or restricted in any Sneha Kalpana, the preparation can be made without the inclusion of Kalka.

Rule No. - 07

पुष्पकल्कस्तु यः स्नेहस्तत्र तोयं चतुर्गुणम्।
स्नेहे स्नेहाष्टमांशश्च पुष्पकल्कः प्रयुज्यते।।

(Sha.S.M.Kh. 9/11-12)

In the case of Pushpa Kalka (flower paste) used in the preparation, it should be taken in a quantity of 1/8th of the amount of Sneha (oil/ghee), rather than following the general ratio.

Importance of Temperature

1. **Proper Extraction of Active Ingredients**:
   - Adequate heating facilitates the extraction of lipid-soluble active principles from the herbs. High temperatures help to break down the cell walls of the plant material, allowing for better infusion of the medicinal properties into the oil or ghee.
2. **Consistency and Texture**:
   - The right temperature is essential for achieving the desired consistency and texture of the final product. If the temperature is too low, the oil may not reach the proper viscosity. Conversely, excessively high temperatures can lead to burning or degradation of the active compounds.
3. **Evaporation of Moisture**:
   - Proper temperature helps in evaporating excess moisture from the herbal mixture. This is important because the presence of water can spoil the preparation and affect its shelf life. The ideal temperature ensures that the preparation becomes a stable and concentrated form.
4. **Formation of Siddhi Lakshanas**:
   - The Siddhi Lakshanas (indicators of successful preparation) can be observed only at specific temperatures. For instance, the absence of sound when the preparation is dropped into fire or the disappearance of foam indicates that the temperature has been adequately maintained.
5. **Preservation of Medicinal Properties**:
   - Maintaining appropriate temperature during preparation helps preserve the potency of the medicinal properties of the herbs. Excessive heat can lead to the loss of volatile oils and other beneficial compounds.
6. **Avoidance of Toxicity**:
   - Certain herbs can become toxic if heated beyond a certain point. Proper temperature control is vital to ensure the safety and efficacy of the final product.
7. **Homogenization of Ingredients**:
   - Proper heating aids in achieving a uniform mixture of the herbal paste (Kalka) and the oil or ghee. This ensures that the active ingredients are evenly distributed throughout the preparation.

Concept of Sneha Murchchhana

Definition: Sneha Murchchhana is a purification process in Ayurveda aimed at enhancing the quality of oils (sneha) used in treatments.

Historical Reference: It is described in the Dipika commentary of Sharngadhara, written in the later part of the 14th century.

Detailed Explanation: The process is elaborated upon in Bhaishajya Ratnavali, particularly in the Jvara Rogaadhikara chapter.

Objectives

- To eliminate durgandha (bad odor).
- To remove amadosha (toxicity).
- To mitigate ugrata (harshness).

Research Findings: Studies indicate an increase in acid value after the Sneha Murchchhana procedure, suggesting changes in the oil's composition.

Process Overview: The technique involves boiling raw oil with a fine powder of selected medicinal herbs and a specific quantity of water to achieve purification and enhance therapeutic efficacy.

Ghrita Murchchhana

Reference: B. R. Jvararogadhikara 5/1266

पथ्याधात्रीबिभीतैर्जलधररजनीमातुलुङ्गद्रवैश्च सर्वैरेतैः सुपिष्टैः पलकपरिमितैर्मन्दमन्दानलेन। आज्यप्रस्थं विपेकेनं परिचपलगतं मूर्छ्यैद्वैराजस्तस्मात् आमोपदोषं हरति च सहसा वीर्यवान् सौख्यदायि।। (B.R., Jvara 5/1266)

Ingredients Used

Drug Name	Part Used	Proportion
Haritaki	P.	48 gms
Bibhitaki	P.	48 gms
Amalaki	P.	48 gms
Musta	Rz.	48 gms
Haridra	Rz.	48 gms
Matulunga Rasa	Fr.	Q.S.
Ghrita	–	768 ml
Jala	–	Equal or double quantity of ghrita

Procedure

1. **Preparation of Kalka Dravya**:
   - Take all the ingredients for Kalka Dravya (Haritaki to Haridra) and grind them into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herbs to make a thick paste (bolus form).
2. **Preparation of Drava Dravya**:
   - Take Matulunga rasa as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Go–Ghrita (1 Part) as mention quantity along with Kalka Dravya (1/4th part) and Drava Dravya (2 Parts).
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha sidhi lakhanas.
5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the ghrita through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered Ghrita to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the murcchita ghrita.

Taila Murchchhana

1. Tila Taila Murchchhana

Reference: B. R. Jvararogadhikara 5/1267-1268

तैलं कृत्वा कटाहे दृढतरविमले मन्दमन्दानलैस्तत्, तैलं निष्फेनभावं गतमिह च यदा शैत्यभावं समेत्य।
मञ्जिष्ठारात्रिलोध्रैर्जलधरनलिकैः सामलैः साक्षपथ्यैः, सूची-पुष्पाङ्घ्रिनीरैः उपहितकथितैर्गन्धयोगं जहाति।।
तैलस्येन्दुकलांशिकैकविकसा भागोऽपि मूर्च्छाविधौ, ये चान्ये त्रिफला-पयोद-रजनी-ह्रीबेर-लोध्रान्विताः।।
सूचीपुष्पवटावरोहनलिकास्तस्याश्च पादांशिकादुर्गन्धं विनिहन्ति तैलमरुणं सौरभ्यमाकुर्वते।। (B.R., Jvara, 5/1267-1268)

Ingredients Used

Drug Name	Part Used	Proportion
Tila Taila	–	1 Part
Manjishtha	St.	1/16th Part
Haridra	Rz.	1/64th part
Lodhra	St. Bk.	1/64th part
Musta	Rz.	1/64th part
Nalika	Rt.	1/64th part
Triphala	P.	1/64th part
Suchipatra Mula Rasa	Lf.	1/64th part
Jala	–	Equal or double quantity of ghrita

Procedure

1. **Preparation of Kalka Dravya**:
   - Take all the ingredients for Kalka Dravya (Manjishtha to Triphala) and grind them into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herbs to make a thick paste (bolus form).

2. **Preparation of Drava Dravya**:
   - Take Suchipatra rasa and jala as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Tila Taila (1 Part) as mention quantity along with Kalka Dravya (1/4th part) and Drava Dravya (2 Parts).
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha siddhi lakshanas.
5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the taila through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered taila to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the murchchhita taila.

2. Sarshapa Taila Murchchhana

Reference: B. R. Jvararogadhikara 5/1269-1270

वयःस्थाजलीपुस्तबिल्वदाडिमकेशरैः।
कृष्णाजीरकह्रीबेरनलिकैः सबिभीतकैः।
एतैः समांशैः प्रस्थे च कर्षमात्रं प्रयोजयेत्।।
अरुणाद् द्विपलं तत्र तोयञ्चाढकसम्मितम्।
कटुतैलं पचेत्तेन चामदोषहरं परम्।।

(B.R., Jvara, 5/1269-1270)

Ingredients Used

Drug Name	Part Used	Proportion
Vayastha	P.	1 Karsha
Rajani	Rz.	1 Karsha
Musta	Rz.	1 Karsha
Bilava	Fr.	1 Karsha
Dadima	Sd.	1 Karsha
Nagakeshara	Sd.	1 Karsha
Krishna Jiraka	Sd.	1 Karsha
Haribera	Rt.	1 Karsha
Nalika	Rt.	1 Karsha
Manjishtha	St.	2 Pala
Sarshapa Taila	–	1 Prastha
Jala	–	1 Adhaka

Procedure

1. **Preparation of Kalka Dravya**:
   - Take all the ingredients for Kalka Dravya (Vayastha to Manjishtha) and grind them into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herbs to make a thick paste (bolus form).
2. **Preparation of Drava Dravya**:
   - Take Jala as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Sarshapa Taila (1 Part) as mention quantity along with Kalka Dravya (1/4th part) and Drava Dravya (4 Parts).
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha sidhi lakhanas.
5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the taila through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered taila to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the murcchita taila.

3. Eranda Taila Murchchhana

Reference: B. R. Jvararogadhikara 5/1271-1272

विकसा मुस्तकं धान्यं त्रिफला वैजयन्तिका।
ह्रीबेरवनखजूरवटशुङ्गा निशायुगम्।।
नलिका-भेषजं देयं केतकी च समं समम्।
प्रस्थे देयं शाणमितं मूर्च्छने दधिकाञ्जिकम्।।

(B.R., Jvara, 5/1271-1272)

Ingredients Used

Drug Name	Proportion
Eranda Taila	1 Prastha
Manjishtha	1 Shana
Musta	1 Shana
Dhanyaka	1 Shana
Triphala	1 Shana
Jayanti	1 Shana
Hribera	1 Shana
Vankharjura	1 Shana
Vatashringi	1 Shana
Haridra	1 Shana
Daruharidra	1 Shana
Nalika	1 Shana
Ketaki	1 Shana
Dadhi + Kanjika	2 Prastha

Procedure

1. **Preparation of Kalka Dravya**:
   - Take all the ingredients for Kalka Dravya (Manjishtha to Ketaki) and grind them into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herbs to make a thick paste (bolus form).
2. **Preparation of Drava Dravya**:
   - Take Dadhi and Kanjika as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Eranda Taila (1 Part) as mention quantity along with Kalka Dravya (1/4th part) and Drava Dravya (4 Parts).
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha siddhi lakhanas.
5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the taila through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered taila to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the murchchhita taila.

Sneha Siddhi Lakshana

वर्तिवत् स्नेहकल्कः स्याद् यदाङ्गुल्या विमर्दितः।
शब्दहीनोऽग्निनिक्षिप्तः स्नेहः सिद्धो भवेत्तदा।
यदा फेनोद्गमस्तैले फेनशान्तिश्च सर्पिषि।
गन्धवर्णरसोत्पत्तिः स्नेहसिद्धिस्तदा भवेत्।।

(Sha.S.M.Kh. 9/12-14)

1. **वर्तिवत् (Vartivat)**:
   - **Meaning**: Like a ball or wick.
   - **Context**: Refers to the herbal paste (Kalka) in the Sneha Kalpana preparation, which, when pressed between fingers, should form a soft ball-like shape, indicating proper consistency.
2. **स्नेहकल्कः (Snehakalkah)**:
   - **Meaning**: The herbal paste mixed with oil or ghee.
   - **Context**: The Kalka, which is mixed with the Sneha (oil/ghee), should change its consistency to a non-sticky and ball-like form when the Sneha is properly prepared.
3. **अङ्गुल्या विमर्दितः (Angulya Vimarditah)**:
   - **Meaning**: When pressed between fingers.
   - **Context**: A test to check the readiness of the Sneha by rubbing the Kalka between fingers to see if it forms a ball without being sticky.
4. **शब्दहीनः (Sabda-Hinah)**:
   - **Meaning**: Soundless, devoid of sound.
   - **Context**: Refers to the absence of any hissing or crackling sound when a drop of Sneha is placed on fire, indicating that all moisture has evaporated, and the preparation is complete.
5. **अग्निनिक्षिप्तः (Agni-Nikshiptah)**:
   - **Meaning**: Placed or dropped onto fire.
   - **Context**: A method to test the Sneha's readiness by dropping it onto fire to check if any sound is produced.
6. **स्नेहः सिद्धः (Snehah Siddhah)**:
   - **Meaning**: Sneha is properly prepared.

- **Context**: Refers to the stage when the oil or ghee has absorbed all the medicinal properties of the herbs and has reached the desired consistency and quality.

7. **फेनोद्गम: (Phenodgamah):**
   - **Meaning**: Appearance of foam.
   - **Context**: Foam formation during heating, particularly in oil, is a sign that the preparation is progressing. The behavior of the foam provides clues about the completion of the process.
8. **फेनशान्ति: (Phena-Santih):**
   - **Meaning**: Disappearance of foam.
   - **Context**: Specifically refers to ghee, where the foam will subside as a sign that the ghee is ready.
9. **गन्ध (Gandha):**
   - **Meaning**: Aroma.
   - **Context**: The development of the right fragrance is an important indicator that the Sneha has been properly prepared.
10. **वर्ण (Varna):**
    - **Meaning**: Color.
    - **Context**: A change in the color of the Sneha signals that the herbs have fully infused their properties into the oil or ghee.
11. **रस (Rasa):**
    - **Meaning**: Taste.
    - **Context**: A proper taste indicates that the Sneha has absorbed the therapeutic properties of the ingredients.
12. **सिद्धि (Siddhi):**
    - **Meaning**: Perfection or accomplishment.
    - **Context**: When the Sneha preparation exhibits all the above qualities (texture, sound, foam, aroma, color, taste), it is considered Siddha, or perfectly prepared for medicinal use.

Types of Snehapaka

a. According to Sharngadhara Samhita:

स्नेहपाकस्त्रिधा प्रोक्तो मृदुर्मध्य: खरस्तथा।।

(Sha.S.M.Kh. 9/14)

1. Mridu Paka
2. Madhyama Paka
3. Khara Paka

Further Classification:

1. Ama Paka
2. Mridu
3. Madhyama Paka
4. Khara Paka
5. Dagdha Paka

b. According to Vagabhata:

1. Manda Paka
2. Chikkana Paka
3. Khara Paka
4. Avishoshi Paka

c. According to Harita:

1. Mridu Paka
2. Madhyama Paka
3. Kathina Paka

1. Mridu Paka:

ईषत्सरसकल्कस्तु स्नेहपाको मृदुर्भवेत्। (Sha.S.M.Kh. 9/15)

Mridu paka refers to the stage where the kalka remains soft to the touch with a slight amount of moisture still present. At this point, it is possible to form vartis, but they will lack the ideal shape and firmness.

2. Madhyam Paka:

मध्यपाकस्य सिद्धिश्च कल्के नीरसकोमले:।।

(Sha.S.M.Kh. 9/15)

Madhyama paka is the stage where the kalka is soft and free of moisture, allowing for the preparation of perfectly shaped vartis with the desired consistency.

3. Khara Paka:

ईषत्कठिनकल्कश्च स्नेहपाको भवेत्खर:। (Sha.S.M.Kh. 9/16)

Khara paka is the stage where the kalka becomes rough to the touch and completely devoid of moisture. While vartis can still be formed at this stage, they tend to break soon after being rolled.

4. Amapaka:

आमपाकश्च निर्वीर्यो वह्निमान्द्यकरो गुरु:। (Sha.S.M.Kh. 9/16)

Ama paka is the stage that occurs before mridu paka, where the sneha (medicated oil or ghee) remains heavy (guru) in nature and lacks potency. Its use can lead to agnimandya (digestive impairment) and is not recommended for therapeutic purposes.

5. Dagdha Paka:

तदूर्ध्वं दग्धपाक: स्याद्दाहकृन्निष्प्रयोजन:।।

(Sha.S.M.Kh. 9/16)

Dagdha paka is the stage that follows khara paka, where the sneha becomes overcooked. Its use can result in daha (a burning sensation throughout the body) and is deemed therapeutically unfit.

Uses of Sneha Paka

नस्यार्थं स्यान्मृदु: पाको मध्यम: सर्वकर्मसु।
अभ्यङ्गार्थं खर: प्रोक्तो युञ्ज्यादेवं यथोचितम्।

(Sha.S.M.Kh. 9/17-18)

a. **Mridu Paka**: For Nasya
b. **Madhyama Paka**: Sarvakarma (Pana, Abhyanga, Basti, Nasya, Karna Purana, Netra Purana, etc.).
c. **Khara Paka**: For Abhyanga.

Patra (Gandha Paka)

Indroduction

- Gandha paka is a process where sneha (medicated oil or ghee) is infused with aroma using selected gandha dravyas (aromatic substances).
- Fine kalka (herbal paste) of these aromatic substances is placed in the vessel, and the warm sneha is filtered into it.
- After the sneha cools slightly, it is filtered again and packed into appropriate containers.
- This method is also referred to as Patra paka.

Gandha Dravya (Aromatic Substances)

एलाचन्दन कुङ्कुमाऽगुरुमुराकक्कोल मांसीशटी
श्रीवासच्छदग्रन्थि पर्णशशभृत्क्षोणिध्वजोशीरकम्।
कस्तूरीनखपूतिशैलजशुभामेथिलवङ्गादिकं गन्धद्रव्यमिदं
प्रदेयमखिलं श्रीविष्णुतैलादिषु।। (Vai.P.Pra., Ch.Kh. 194)

- Ela (Elettaria cardamomum)
- Chandana (Santalum album)
- Kumkuma (Crocus sativus)
- Aguru (Aquilaria agallocha)
- Mura
- Kakkola (Piper cubaba)
- Jatamamsi (Nordostachys jatamansi)
- Sati (Hedychium spicatium)
- Shrivasa (Shveta chandana)
- Cchada (Tejapatra; Cinnamomum zeylanicum)
- Granthiparni
- Karpura (Cinnamomum camphora)
- Usira (Vetiveria zizanioidis)
- Kasturi (Mrga mada)
- Nakhi
- Puti (Gynandropsis gynandra)
- Sailaja
- Shubha
- Methika (Trigonella foenum-graecum)
- Lavanga (Syzygium aromaticum)

These aromatic substances are used in Shrivishnu taila and various other sneha preparations for fragrance.

Ratio of Gandha Dravya

तैलात् गन्धस्य पादार्द्धं दद्यात् तच्छास्त्रविदिभषक्।
केचिद् कल्कसमं मन्ये सर्वत्र गन्धकर्मणि।।

(Vai.P.Pra., Ch.Kh.198)

- According to wise physicians, the quantity of gandha dravya kalka should be 1/8th (padardha) of the total oil quantity.
- Some physicians suggest that the quantity of gandha dravya kalka should be equal to the sneha kalka dravya, i.e., 1/4th of the total taila quantity.
- Both methods are accepted and followed.

Time duration to Cook Sneha Preparation

घृततैलगुडादींश्च साधयेन्नैकवासरे।
प्रकुर्वन्त्युषिता ह्येते विशेषाद् गुणसङ्चयम्।

(Sha.S.M.Kh. 9/18)

Ghrita, taila, guda, and other such preparations should not be cooked in a single day, as doing so may prevent them from achieving the desired therapeutic properties.

Instead, the preparation process should be spread over multiple days, with cooking taking place during the daytime and allowing the paka (mixture) to cool overnight.

क्षीरे द्विरात्रं स्वरसे त्रिरात्रं तक्रारनालादिषु पञ्चरात्रम्।
स्नेहं पचेद्वैद्यवर: प्रयत्नादित्याहुरेके भिषज: प्रवीणा:।।
द्वादशाहन्तु मूलानां वल्लीनां क्रममेव च।
एकाहं व्रीहिमांसानां पाकं कुर्याद् विचक्षण:।।

(Vai.P.Pra., Tri.Kh. 27-28)

Sr. No.	Drava Dravya	Time Required
1.	Kshira	2 Nights
2.	Svarasa	3 Nights
3.	Takra, Arnaal, Kanji, Gomutra	5 Nights
4.	Mula (Roots), Lata (Climber)	12 Days
5.	Dhanya, Mamsarasa	1 Day

Dose

1 Pala (48 gms)

Shef life

1. According to Sharngadhara Samhita- 16 months
2. According to Yoga Ratnakara- 12 months
3. According to Vangasena- 6 months
4. According to Gazzet of Governament of India 2016–
   - Ghrita- 2 Years
   - Taila- 3 Years

Phala grita

Reference: AFI, Part- 01.

मञ्जिष्ठाकुष्ठनगरत्रिफलाशर्करावचाः।।
द्वे निशे मधुकं मेदां दीप्यकः कटुरोहिणीम्।
पथ्याहिङ्गुकाकोलीवाजिगन्धाशतावरीः।।
पिष्ट्वा क्षाणीःघृतप्रस्थं पचेत्क्षीरचतुर्गुणम्।
योनिशुक्रप्रदोषेषु तत्सर्वेषु च शस्यते।।
आयुष्यं पौष्टिकं मेध्यं धन्यं पुंसवनं परम्।
फलसर्पिरिति ख्यातं पुष्ये पीतं फलाय यत्।।
म्रियमाणप्रजानां च गर्भिणीनां च पूजितम्।
एतत्परं च बालानां ग्रहघ्नं देहवर्धनम्।।

(A.Hri.Utt. 34/63-67)

Ingredients Used

Drug Name	Part Used	Proportion
Manjishtha	Pl.	12 gms
Kushtha	Rt.	12 gms
Tagara	Rt.	12 gms
Haritaki	P.	12 gms
Bibhitaki	P.	12 gms
Amalaki	P.	12 gms
Sarkara	-	12 gms
Vaca	Rz.	12 gms
Haridra	Rz.	12 gms
Daruharidra	St.	12 gms
Yashti	Rt.	12 gms
Meda	Rt. Tr.	12 gms
Yavani	Fr.	12 gms
Katuka	Rt.	12 gms
Kshira vidari	Rt. Tr.	12 gms
Hingu	Exd.	12 gms
Kakoli	Sub. Rt.	12 gms
Ashvagandha	Rt.	12 gms
Satavari	Rt. Tr.	12 gms
Go Ghrita	–	768 gms
Go Dugdha	–	3.072 l

Procedure

1. **Preparation of Kalka Dravya**:
   - Take all the ingredients for Kalka Dravya (Manjishtha to Shatavari) and grind them into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herbs to make a thick paste (bolus form).
2. **Preparation of Drava Dravya**:
   - Take also Go-Dugha as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Go-Ghrita (1 Part) as mention quantity along with Kalka Dravya ($1/4^{th}$ part) and Drava Dravya (4 Parts).
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha siddhi lakshanas.
5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the ghrita through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered Ghrita to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the medicated oil or ghee.

Dose: 12gms

Anupana: Warm Water

Therapeutic Indications: Bala Roga, Bala Graha, Shukra Vikara, Yoni Vikara, Vandhyatva, Garbhini Roga, Karshya.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Effect of Phala Ghrita on Development of Ovarian Follicle Followed by Beejotsarga (Ovulation) in Patients of Infertility Due to Ovarian Factor in Comparison with Clomiphene Citrate	Mohan Yende Ph.D. (Scholar), Mahatma Gandhi Ayurved College and Research Centre, Salod.	In a single-blind randomized controlled trial, 30 participants in each group receive either Phala Ghrita (10 ml B.D. with cow milk 100 ml Anupana) or Tab. Clomiphene citrate (50 mg O.D. from day 3 to 7 of menstrual cycle). Primary outcomes assess follicle development and ovulation, with secondary outcomes evaluating conception. The conclusion will address Phala Ghrita's observed effects.
2.	Clinical Trial of Phala ghrita on Female Infertility	Dr. S.P. Otta, Lecturer, in Prasuati & stree roga, N.K. J. Ayurvedic medical college & P.G. Center, Bidar.	The study involved 30 cases of female infertility treated with intrauterine insufflation of Phalagritam. After three consecutive cycles, encouraging results were observed, detailed in the full paper.
3.	Phamacognostical and Phramacuetical Analysis of Phala Ghrita-An Ayurvedic Polyherble Formulation	Jitendra Varsakiya, Ph.D Scholar, Depart. of Kayachikitsa, Ayurveda, Gujarat Ayurved university.Gujarat. University, Gujrat Jamnagar,	Pharmacognostical study: Ashwagandha starch, Bibhitaki tannic contents, Haridra oil resin, Manjishtha crystals, Shatavari raphides and vessels, Tagar cells. Yashtimadhu had compound starch. Pharmaceutical evaluation: 13% w/w drying loss, pH 5.5. HPTLC: 8 spots at 254nm, 4 spots at 366nm.
4.	Efficacy of Phala Ghrita and Cow Ghee in the Management of Oligozoospermia A comparative Clinical Study	Varsakiya, Dept. of Kayachikitsa, CBPACS, New Dehli-110073.	Ninety-nine males with oligospermia (sperm count <15 million/mL) underwent Ayurvedic Bio-cleansing using Haritakyadi Yoga. PHG (n=51) and CG (n=42) received 10g twice daily with warm milk for 8 weeks. Both groups showed significant improvements in sperm parameters, with PHG demonstrating better outcomes except for semen volume.
5.	Efficacy of Phala Ghrita on Female Infertility	Shalini Biala, M.S. Scholar, Depart. Of Post Graduate Studies in Prasooti Tantra & StreeRoga, Major S.D. Singh P.G. Ayurvedic Medical College, Farrukhabad (U.P.), India.	Orai Phala-ghrita for three months resulted in 22% pregnancy in female infertility patients with no adverse effects. Despite encouraging results, conception rates are low. Further large-scale studies with alternative administration methods are needed for better outcomes.

Ksheerabala Bala Taila

Reference: AFI, Part- 01

बलाकल्कषायाभ्यां तैलं क्षीरसमं पचेत्।
सहस्रशतपाकं तद् वातासृग्वातरोगनुत्।।
रसायनं मुख्यतममिन्द्रियाणां प्रसादनम्।
जीवनं बृंहणं स्वर्यं शुक्रासृग्दोषनाशनम्।।

(A.Hri.Chiki. Adhyaya 22/45-46)

Ingredients Used

Drug Name	Part Used	Proportion
Bala Kashaya	Rt.	16 Parts
Bala Kalka	Rt.	1 Part
Tila Taila	Ol.	4 Parts
Go-Dugdha	–	4 Parts
Water	–	16 Parts

Procedure

1. **Preparation of Kalka Dravya**:
   - Take Bala dravya as Kalka Dravya and grind it into a fine powder (Churna).
   - Add a sufficient quantity of water to the powdered herb to make a thick paste (bolus form).
2. **Preparation of Drava Dravya**:
   - Prepare the kvatha, by root of Bala kvatha as per classical references.
   - Take Go- Dugdha as drava dravya.
3. **Mixing**:
   - In a clean vessel, add Tila taila as mention quantity along with Kalka Dravya and Drava Dravya.
4. **Heating**:
   - Place the mixture over a low flame. Stir continuously to prevent the Kalka from sticking to the bottom and ensure even cooking.
   - Maintain a consistent low flame to avoid burning the ingredients. Heat the mixture until the water content evaporates and sneha siddhi lakhanas.

5. **Filtering**:
   - Once the Sneha siddhi lakshana attains, remove it from the heat.
   - Filter the taila through a clean, dry cloth to remove the solid residues of the herbal paste.
6. **Cooling and Storage**:
   - Allow the filtered taila to cool down to room temperature.
   - Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency of the medicated oil or ghee.

Dose: 12 gms, Also used for Abhyanga and Nasya.

Anupana: Milk and Warm Water.

Therapeutic Indications: Vatarakta, Vataroga, Shukra Dosha, Rajodosha, Svarabheda, Rasayana.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Standardisation of Ksheerabala Taila	V. Nageswar Rao Department of Rasa shastra, Institute of medical sciences, Banaras Hindu University, Varanasi – 221 005	The study found that varying levels of heat impact several physical and chemical properties of Ksheerabala taila, including specific gravity, refractive index, acid value, saponification value, and iodine value. However, thin layer chromatography showed no discernible differences among samples. Additionally, visible and ultraviolet spectral studies indicated no significant variations across different stages of Ksheerabala taila.
2.	Ksheerabala Taila- A Pharmaceutico-Analytical Study w.s.r to its Trividha Paka	Chithra G Nair, Department of PG studies in Rasashastra and Bhaishajya Kalpana, MVr~Ayurveda Medical College, Parassinikkadavu, Kannur, Kerala, India	The study reaffirmed the pharmaceutical and therapeutic distinctions among the three pakas as described in classical texts. Mrudu paka of sneha is specified for nasya, Madhyama paka for pana, nasya, and basti, covering multiple applications, while Khara paka is designated for abhyanga. The analytical findings align with the traditional descriptions, supporting the therapeutic efficacy of each paka based on pharmaceutico-analytical observations.
3.	A Clinical Study to Evaluate Effect of Ksheerbala Taila Nasya in the Management of Avabahuk W.S.R. Frozen Shoulder	Dr. Jaya K. Ghore B.A.M.S., M.D. Associate Prof. Panchakarma, D.Y.Patil School of Ayurveda, Nerul, Navi Mumbai	The study aimed to evaluate the effectiveness of Nasya treatment using Ksheerbala taila for Avbahuka. Fifteen patients were included in an open-label single-group clinical trial. The results demonstrated that Nasya with Ksheerbala taila significantly alleviated symptoms of Avbahuka, as evidenced by statistically significant findings.
4.	Development of Quality Standard of Ksheerabala Oil: An Ayurvedic Formulation	T Jyostna kumara, Asst professor, Dr NRS Ayurvedic Medical College, Vijayawada, AP	This study aims to standardize Ksheerabalatailam using Sida cordifolia root powder processed with sesame oil and milk. It evaluates properties like saponification, iodine, acid, peroxide values, total fat, and conducts HPTLC and GC-MS analyses. These findings authenticate and standardize Ksheerabalatailam, aiding in identifying counterfeit products.
5.	A Study of Ksheerbala Tail Nasya in the Management of Sandhi Gat Vata With Special Reference to Cervical Spondylosis	Dr. Pankaj Kumar Shukla, M.D. (Panchakarma), Assistant Professor, Dept. of Panchakarma, Major S.D. P.G. Ayurvedic Medical College & Hospital, Fatehgarh, Farrukhabad, UP	The study stresses the importance of a healthy diet for disease prevention. Nasya is recommended for purification, while Ksheer bala taila offers anti-inflammatory and anti-bacterial properties, promoting overall health and joint strength.

Concept of Avartana

Avartana is the process of repeatedly performing snehapaka (medicated oil or ghee preparation) by adding drava dravya (liquids such as decoctions, milk, etc.) and kalka (herbal paste) multiple times to enhance the potency and therapeutic properties of the preparation.

E.g.-

Sr. No.	Name of Formulation	Reference	Avartita	Indication
1.	Anu Taila	As.Sa.Su. 29.	Dashapaki (10 Times)	Nasya Karma
2.	Bhallataka Taila	Cha.Sa.Chi.1/2/16	Shatapaki (100 Times)	Rasayana
3.	Bala Taila	Cha.Sa.Chi.29	Sahasrapaka (1000 Times)	Vatarakta, Vata Roga, Jivana, Svarya

Significance of Avartana

1. **Increased Potency:** Repeated cycles of snehapaka with drava dravya (decoction, milk, etc.) and kalka (herbal paste) enhance the potency of the sneha, making it more effective in treating various diseases.
2. **Concentrated Therapeutic Effect:** With each repetition, the oil or ghee absorbs more of the medicinal properties of the herbs, leading to a more concentrated therapeutic formulation.
3. **Improved Shelf Life:** Avartana also increases the shelf life of the preparation, making it more stable and effective over time.
4. **Targeted Action:** Depending on the number of repetitions (e.g., Dashapaka for 10 cycles, Shatapaka for 100 cycles, or Sahasrapaka for 1000 cycles), the formulation is tailored for specific therapeutic needs, targeting particular doshas and diseases.
5. **Enhanced Absorption:** Repeated processing helps break down the herbal constituents, improving their bioavailability and enhancing the body's ability to absorb and utilize the medicinal properties effectively.
6. **Balanced Dosha Action:** Avartana helps balance the Tridoshas (Vata, Pitta, and Kapha) more efficiently, making the formulation suitable for complex or chronic diseases.

Ratinality behind Concept of Avartana

1. **Increased Potency**: Repeated paka concentrates active principles, boosting potency.
2. **Progressive Lightness**: Each cycle lightens the Sneha, improving tissue penetration and balancing doshas.
3. **Molecular Changes**: Structural alterations increase surface area for absorption, enhancing bioavailability and prolonging serum concentration.
4. **Complex Structure Formation**: Transforming simple molecules into complex ones maintains therapeutic levels and slows excretion.
5. **Active Compound Modification**: Changes in active compounds enhance efficacy.
6. **Phyto-Chemical Enrichment**: Each cycle extracts more phytochemicals from herbal ingredients.
7. **Maximized Absorption**: Heat simplifies compounds for better absorption.
8. **Enhanced Bioavailability**: Repeated processing increases effectiveness.
9. **Concentrated Medicine**: High concentration allows for effective smaller doses.
10. **Rapid Absorption**: The concentrated form facilitates quick uptake.
11. **Lipophilic Properties**: Converts non-lipid substances to lipid-soluble forms, enabling penetration of the blood-brain barrier.

NOTE : Acharya Chakrapani recommends adding milk each time the process of Avartana is repeated. This addition of milk serves to replenish the Sneha (oily component), compensating for the loss that occurs during the Avartana procedure. Acharya Gayadasa and Adhamalla also support this concept.

Research updates on Snehakalpana

Sr. No.	Article Name	Author Name	Result
1.	A Critical Review On Sneha Kalpana: Oleaginous Dosage Forms	Gopendra Kumar Singh, M.D. Scholar, Department of Rasashastra & Bhaishajya Kalpana, Government PG Ayurvedic College and Hospital, Varanasi.	This paper explains all aspects of Sneha Kalpana, including its physicochemical parameters, therapeutic applications, composition, and the analytical parameters of fats and oils.
2.	A Rational Understanding of Sneha Kalpana	Roshni V. K., Department of Rasa Shastra and Bhaishajya Kalpana, S. V. Ayurveda Medical College and Hospital T. T. D, Tirupati-517507, Andhra Pradesh, India	This paper highlights Sneha Kalpana as a unique Ayurvedic dosage form that extracts both lipid and water-soluble active principles. It is commonly used in liquid form and administered through various routes in the body. Avartita Sneha enhances the potency of oleaginous formulations, with each of the three drugs in Kuzhambu playing a specific role. Sneha Kalpana is particularly important in therapeutics, especially for external application, due to its significant therapeutic effects.
3.	Classical And Modern Review On Sneha Kalpana W.S.r~ To	Shivani Koul Assistant professor, Dept of RSBK, Prakash Institute of Ayurvedic Medical	This paper highlights that Sneha Kalpana extracts fat-soluble active principles and enhances drug permeability for easier absorption. It is the only dosage form administered

Sr. No.	Article Name	Author Name	Result
	Ghrita Kalpana	Sciences & Research, Jhajhar, Bulandshahr (U.P.), India	through all body routes, including nasal, ocular, auditory, oral, topical, and rectal. Modern drug delivery systems can utilize Sneha Kalpana (lipids) to boost bioavailability and therapeutic efficacy.
4.	A comparative review study of Sneha Kalpana (Paka) vis-avis liposome	Neetu Singh, Research Scholar, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India	This paper emphasizes that Sneha Kalpana, a category of medicated oils and ghee in Ayurveda, is used to treat a wide variety of ailments across all age groups. On the other hand, the liposomal drug delivery system is a recent innovation in modern medicine, known for effectively targeting therapeutic areas. Interestingly, both systems exhibit a distinct similarity due to their aqueous and oleaginous (fat-based) composition, suggesting they may be two complementary approaches. A literature review was conducted to explore the potential for future research, combining the knowledge from both fields to benefit humanity.

Market Survey

1. Sneha Kalpana Market Insight

- **Market Segments**: Their market can be divided as follows: Therapeutic oils (Taila) for joint pains, skin problems, and nervous system. Medicated ghee (Ghrita) is used for internal consumption to support digestion, cognitive function, and immunity.
- **Demographics**: All age groups (elderly for joint pain relief, young adults for wellness, children for immunity), as well as Ayurveda clinics, centers, and online platforms for Ayurvedic products.

2. Consumer Awareness and Demand

- **Knowledge Grade**: A large number of customers know Sneha Kalpana for external use (like medicated massage oil), but fewer are aware of its internal variety, like medicated ghee.
- **Demand Trends**: Increasing consumer inclination towards natural holistic health products is driving the demand for Sneha Kalpana. With the aging population, there is a demand for products that help manage chronic conditions like arthritis, digestive, and skin issues.

3. Competitive Landscape

- **Leading Players**: Major Ayurvedic firms such as Patanjali, Baidyanath, Dabur, Kottakkal Arya Vaidya Shala, and smaller local brands.
- **Price Pointing**: The market has a variety of price points, with higher-priced items made from organic or high-quality ingredients.

4. Product Availability

- **Sales Channels**: Traditional Ayurvedic clinics and pharmacies, online platforms like Amazon, 1mg, dedicated Ayurvedic websites, and health & wellness retail stores.
- **Geographical Reach**: Products are used across India, with increasing interest in international markets, including the US, Europe, and Southeast Asia.

5. Rating and User Preferences

- **Common Formulations**: Kshirabala Taila, Mahanarayana Taila, and Shatavari Ghrita are popular. Products marketing themselves as anti-inflammatory or immune-boosting are in demand.
- **Packaging and Quality**: Consumers prefer eco-friendly, durable packaging with clear labelling.
- **Rasa & Gandha**: Taste and aroma, especially in medicated ghee, play a key role in consumer choices.

6. Regulatory Environment

- **Government Support**: The Indian government, through entities like AYUSH Ministry, has helped popularize Sneha Kalpana.
- **Challenges**: Quality control, standardization, and compliance with FSSAI for food-grade products or FDA for export.

7. Challenges and Opportunities

- **Challenges**: Limited awareness of internal use of Sneha Kalpana and competition from other health supplements and modern drugs.
- **Opportunities**: Partnerships with modern health brands, combining Ayurveda with modern healthcare, and expansion into global markets due to rising interest in natural remedies.

8. Future Outlook

- With increasing global favor for traditional medicine and natural wellness solutions, Sneha Kalpana products are well-positioned for growth. Educational campaigns, improved packaging, and modern technology integration in quality control can further drive market expansion.

Sandhana Kalpana

Introduction

- Sandhana Kalpana is a unique Ayurvedic dosage form that involves natural fermentation to create acidic and alcoholic preparations like Asava and Arishta.
- This method has been practiced for thousands of years for its potent therapeutic effects.
- **सन्धीयते यद् इति सन्धानम्।।** (Shabdakalpadruma)
- The literal meaning of the term Sandhana is the process of fermentation.
- Fermentation occurs when enzymes such as invertase and zymase, secreted by yeast cells, convert sugars in the liquid preparation into glucose, fructose, ethanol, and carbon dioxide.
- Ethanol is self-generated during the process, enhancing the medicinal properties of the formulation.
- The fermentation process allows for the extraction of both water- and alcohol-soluble active ingredients from medicinal herbs.
- The resulting products have a longer shelf life, rapid absorption, and superior therapeutic efficacy compared to other Ayurvedic formulations.

Significance of Sandhana Kalpana

1. Cultures Originate from Alcohol as a Chemical Method of Preservation:
   - The high content of alcohol (naturally present in Sandhana Kalpana) acts as a self-preservative, maintaining the stability of the medicine.
2. Increased and Improved Shelf Life:
   - These preparations have an extended shelf life and age like wine, increasing in fineness over time if properly stored.
3. Fast in Absorption and Bio-Availability:
   - The tiksna gunas (sharp qualities) of the fermented alcohol promote faster transportation and circulation of active molecules.
4. Higher Bioavailability, Improved Efficacy:
   - Sandhana Kalpana formulations have the highest bioavailability and pharmacological action compared to other dosage forms due to their fermentation process.
5. Ease of Administration:
   - These preparations are easily administered in liquid form, suitable for pediatric and geriatric patients, making them versatile for all ages.
6. Increases Appetite and Improves Digestion:
   - These Ayurvedic formulations ignite appetite by increasing enzymatic activity, enhancing digestion.
7. Palatability and Nutritive Sweeteners:
   - Sweetening agents like jaggery, sugar, grapes, and honey enhance both taste and nutrient content.
8. Nutritive and Medicinal Uses:
   - These sweetening agents add nutritional value, making them a key component of Sandhana Kalpana formulations in traditional healthcare.

Definition

द्रवेषु चिरकालस्थं द्रव्यं यत्सन्धितं भवेत्।
आसवारिष्टभेदैस्तु प्रोच्यते भेषजोचितम्।।

(Sha.S.M.Kh. 10/1)

Sandhana Kalpana is an Ayurvedic process of fermentation, where a liquid base such as kvatha (decoction), svarasa (fresh juice), or other liquid preparations is combined with madhura dravya (sweetening agents like jaggery, honey, or sugar), prakshepa dravya (fine powders of medicinal herbs), and sandhana dravya (fermentation initiators like dhataki flowers or madhuka flowers). These ingredients are placed in an inert vessel, traditionally a mud pot, which is sealed and left undisturbed for a specified period, allowing the natural fermentation process to occur. The two main

outcomes of this process are Asava and Arishta, which are Ayurvedic fermented medicinal products.

Classification

1. Madhya Kalpana:

- Sura- Prasanna, Kadambari, Jagala, Medaka, Surabija
- Sidhu
- Asava
- Varuni
- Arishta

2. Shukta Kalpana:

- Shukta
- Kanjika
- Tushambu
- Sauvira
- Sandaki

Difference between Madhya and Shukta Kalpana

Sr. No.	Charateristics	Madhya Kalpana	Shukta Kalpana
1.	End Product	Alcohol	Acetic Acid
2.	Carrier	Yeast Cells	Acid Bacilli
3.	Time Duration	15 days- 6 months	15 days
4.	Adding Agent	Sweetening Agent except Sura	Carbohydrates

General Method of Preparation of Sandhana Kalpana

1. **Preparation of Fresh Dravyas**: If using fresh ingredients, rinse and clean them thoroughly in potable water. Cut them into small pieces and set aside.
2. **Preparation of Dry Dravyas**: For dry ingredients, pound them into a coarse powder.
3. **Decoction for Arishta**: In the preparation of Arishta, boil the primary ingredient in water six times its volume. Continue boiling until the water reduces to one-fourth of its initial volume.
4. **Soaking for Asava**: For Asava, soak the primary ingredients in water ten times their volume.
5. **Addition of Sweetening Agents**: Once the decoction (or soaked liquid) is ready, add the sweetening agents. Stir well to ensure they dissolve completely.
6. **Filtration**: Strain the liquid mixture into another clean vessel.
7. **Selection of Sandhana Patra**: Choose a suitable fermentation vessel (Sandhana Patra), inspecting it thoroughly to ensure there are no cracks or leaks.
8. **Smearing of Lepana Dravya**: Coat the inside of the vessel with a prescribed herbal paste (Lepana Dravya) to prepare it for fermentation.
9. **Fumigation of the Vessel**: Fumigate the vessel using the recommended herbs (Dhupa Dravya). This helps to dry any remaining moisture, sterilize the vessel, and act as an antimicrobial agent.
10. **Transfer of Liquid**: After fumigation, pour the prepared liquid into the Sandhana Patra, ensuring the vessel is only filled halfway to three-fourths of its capacity. This leaves room for gases that will form during fermentation.
11. **Addition of Prakshepa Dravyas**: Just before sealing the vessel, add the coarsely powdered fermenting agents (Prakshepa Dravyas) and mix them thoroughly to prevent sedimentation.
12. **Sealing the Sandhana Patra**: Once mixed, seal the vessel. Bury the vessel in a layer of husk to maintain an even temperature and protect it from external environmental changes.
13. **Initial Fermentation**: After 3–5 days, when fermentation begins, tightly seal the vessel with multiple layers of clay-smeared cloth to prevent contamination.
14. **Fermentation Period**: Leave the sealed vessel undisturbed for the specified period of fermentation. Observe the process to ensure fermentation is progressing properly.
15. **Completion of Fermentation**: When fermentation is complete, unseal the vessel, siphon off the fermented liquid, and store it in appropriate containers for therapeutic use.

Essential Ingredients

1. Drava Dravya- Kvatha, Svarasa, Hima, Phanta, etc.
2. Madhura Dravya- Sharkara, Khanda, Guda, Madhu, etc.
3. Prakshepaka Dravya- Medicinal drugs (Powder form)
4. Sandhana Dravya- Dhataki Pushpa, Madhuka Pushpa, etc.

Anukta Mana

अनुक्तमानारिष्टेषु द्रवद्रोणे तुलां गुडम्।
क्षौद्रं क्षिपेद् गुडादर्धं प्रक्षेपं दशमांशकम्।।

(Sha.S.M.Kh. 10/3)

Sr. No.	Ingredients	Anukta mana
1.	Dravadravya	1 Drona
2.	Guda	1 Tula
3.	Madhu	½ Tula
4.	Prakshepaka Dravya	1/10 of Guda

Observations

Sr. No.	Charaterstics	Onset of fermentation	Completion of fermentation
1.	Hissing Sound	Present	Absent
2.	Effervescence	Present	Absent
3.	Odour	Mild Alcoholic	Strong Alcoholic
4.	Burning Candle Test	Neagtive (Put-Off)	Positive (Continous Burn)
5.	Lime Water Test	Positive (Turns to milky white)	Negative (No changes)
6.	Floating of Prakshepa Dravya over Liquid	Present	Absent

a. Burnig Candle Test

The Candle Test is used to monitor the fermentation process during Sandhana Kalpana by detecting the presence of carbon dioxide (CO_2). Follow this procedure to assess the status of fermentation:

1. Initial Stage of Fermentation

- During the onset of fermentation, carbon dioxide (CO_2) is produced within the Sandhana Patra.
- To check the progress, bring a burning candle near the mouth of the vessel.

Observation: If the candle extinguishes, it indicates the presence of CO_2, signifying that fermentation has begun.

2. Completion Stage of Fermentation:

- As fermentation progresses, CO_2 generation will gradually cease.
- To verify completion, repeat the candle test.

Observation: If the candle continues to burn brightly, it confirms the absence of CO_2, indicating that the fermentation process has completed.

3. Interpretation

- The candle extinguishing during the test suggests active CO_2 production, confirming fermentation is ongoing.
- A brightly burning candle implies that fermentation is complete, as CO_2 is no longer present in significant amounts.

This simple test helps in determining the status of the fermentation process based on the presence or absence of CO_2.

b. Lime water Test

This procedure involves periodically testing for carbon dioxide (CO_2) during the fermentation process in Sandhana Kalpana to monitor progress:

1. **Preparation of the Lid**:
   - When sealing the Sandhana Patra, drill a small hole in the lid.
   - Insert a small pipe (approximately 0.5 to 1 cm in diameter) through the hole before placing the vessel in a heap of husk.
2. **Testing for CO_2**:
   - Periodically, withdraw the pipe from the lid and dip its end into a container filled with lime water (calcium hydroxide solution).
   - Observation: If the lime water turns milky-white, it indicates the presence of CO_2, confirming active fermentation.
3. **Purpose of the Test**:
   - This test should be conducted at regular intervals throughout the fermentation process.
   - The presence or absence of CO_2 helps determine the current stage of fermentation. Active CO_2 production suggests ongoing fermentation, while its absence indicates fermentation is nearing completion.

This method offers a reliable way to monitor fermentation progress by checking for CO_2 production.

Important factors in Asava Arishta Preparation

Sandhanana Patra Selection

Patra (Vessel Selection) Guidelines

1. **Non-Reactive**: The vessel must not react with the ingredients during fermentation or storage.
2. **Specified Make**: Use the vessel type specified for the formulation.
3. **Default Option**: If unspecified, opt for a stainless steel vessel.

General Patras:

1. Mrita Patra
2. Wooden Drums
3. Cement Tanks

4. Synthetic Drums
5. Glass Jars
6. Stainless Steel Drums
7. Procelain Jars

Specific Patras:

Different types of Patra used in different type of Sandhana Formulations: –

1. Lauha Patra- Madhavasva
2. Earthen/ Mud Pots- Dashmula Arishta
3. Suvarna Patra- Sarsvatarishta

Patra Samskara:

Aim

1. Sterilization of vessel
2. To prevent the entrance of air from outside to inside.

Types

1. **Samanya Samskara**:
   - Lepana- Ghrita, Pippali, Madhu, Sarshapa Taila, etc. used.
   - Dhupana- Agaru, Guggulu, Chandana, etc. used.
2. **Vishesha Samskara**:
   - Also known as Amalata Virodhi Samskarana. Suddha Jala is used with 1:15 ratio (Suddha: Water).

Place for Fermentaion

Burying fermentation containers in a heap of husk during the preparation of Asava and Arishta in Ayurveda is a traditional method with sound reasoning behind it: –

1. **Temperature Regulation:** Fermentation requires a stable, moderate temperature for optimal microbial activity. External weather changes, especially fluctuations in heat or cold, can disrupt the fermentation process. The husk acts as an insulator, maintaining a more consistent internal temperature around the container, protecting it from external temperature variations that could slow down or spoil the fermentation.
2. **Protection from Light:** Light exposure can degrade certain compounds in the formulation, affecting both the quality and efficacy of the final product. The darkness provided by burying the container in husk prevents light from reaching the preparation, preserving its integrity.
3. **Prevention of Atmospheric Contamination:** By burying the containers, the environment remains relatively enclosed, reducing the risk of contamination from dust, pollutants, or microorganisms present in the open air. This helps in keeping the fermentation process cleaner and safer.

Importance of Room Temperature

1. **Best Fermentation Environment**:
   - Temperature directly influences fermentation speed and quality. A room temperature between 25°C to 30°C is ideal for the growth of yeast and bacteria, promoting effective natural fermentation.
   - Lower temperatures can slow or halt fermentation, leading to weaker formulations, while higher temperatures can cause over-fermentation, resulting in spoilage or reduced medicinal potency.
2. **Consistency of Fermentation Process**:
   - Maintaining a constant room temperature ensures consistent fermentation. Fluctuations can lead to uneven fermentation, which can negatively impact the taste, quality, and efficacy of the final product.
   - Unstable temperatures might also alter microbial activity, either destroying beneficial organisms or promoting the growth of unwanted contaminants.
3. **Retention of Therapeutic Action**:
   - Proper temperature ensures the active principles of herbs are extracted and maintained in the formulation, preserving their medicinal efficacy.
   - High temperatures can cause the loss of volatile compounds or essential oils, reducing the product's therapeutic benefits.
4. **Contamination Control**:
   - Temperatures above 35°C (95°F) increase the risk of microbial contamination. Controlling room temperature prevents the growth of harmful microorganisms that could compromise the product's quality.

5. **Storage Stability**:
   - After fermentation, products are stored at moderate temperatures to maintain potency and shelf life. Drastic temperature changes during storage can alter the chemical composition and cause deterioration.
   - Proper room temperature management is crucial in Sandhana Kalpana to achieve high-quality, stable, and therapeutically potent formulations.

Sandhana Kala

- The ideal seasons for preparing Asava and Arishta, according to Ayurvedic classics, are Vasanta (spring) from March to May and Sarada (autumn) from September to November, as these periods offer optimal conditions for fermentation.
- In summer season = 7-15 days
- In winter, the cooler climate slows fermentation (30 days), while the rainy season increases the risk of fungal growth.

Different Scholars mention different time Duration

Sr. No.	References	Minimum Time Period	Maximum Time Peroid
1.	Charaka Samhita	7 Days	45 Days
2.	Sushruta Samhita	7 Days	120 Days
3.	Ashtanga Sangraha	7 Days	180 Days
4.	Ashtanga Hridaya	14 Days	30 Days

Adding of Honey, Bhasma, Prakshepaka Dravya

- Prakshepaka dravya (additive substances) are added in fine powder form, alongside sandhana dravya, after the liquid preparation is placed in the container.
- These substances must be dry and free from infestation.
- Honey is often used as a prakshepa dravya (additive substance). It acts as both a sweetening agent and a preservative, while also enhancing the therapeutic properties of the formulation.
- e.g. **Drakshaasava:** Honey is used as a prakshepa dravya in this preparation, which is made from fermented grapes (draksha). Honey helps in enhancing digestion and improving the therapeutic effects of the final product.
- Classical references support the use of metallic foils or incinerated metals (bhasma) in Asava and Arishta preparations.
- Examples include:
  1. Lauha bhasma in Lohasava
  2. Svarna Makshika bhasma in Kumaryasava
  3. Svarna bhasma in Sarasvatarishta
- Varitara bhasma (lighter bhasma) is generally preferred.
- These bhasmas dissolve in the liquid due to the corrosive action of self-generated alcohol during fermentation.

Difference between Asava & Arishta

Sr. No.	Charaterstics	Asava	Arishta
1.	Main Ingredient	Drava Pradhana	Dravya Pradhana
2.	Method of Preparation	Kvatha will not used Expection- Kumaryaasava, Drakshaasava, Lodhraasava, Vasakasava, Madhukasava	Kvatha will used. Expection- Takraarishta
3.	Virya	Shita Virya Dravya	Ushna Virya Dravya
4.	Guna	Guru	Laghu
5.	Viscosity	Less	More
6.	Specific Gravity	Less	More
7.	Prakriti	Mridu	Tikshna
8.	Preference	Pediatric Cases	Adult Andold Age
9.	Dosha Balancing	Pitta Janya Vyadhi	Vata- Kapha- Janya Vyadhi

Dose

1 Pala (48 gms)

Sevana Kala

Administrated in diluted form after food but not on empty stomach.

Shelf Life

1. According to Sharngadhara Samhita- Infinite
2. According to Gazzet of Governament of India 2016–10 Years

Percentage of Alcohol Content

In Sandhana Kalpana (preparations like Asava and Arishta), the self-generated alcohol content typically ranges between 5-10%. This amount can vary depending on the formulation, ingredients used, and the fermentation conditions.

Sr. No.	Formulations	Percentage
1.	Arjunarishta	4.0-8.0 % v/v
2.	Abhayarishta	3.5- 4.5 % v/v
3.	Drakshaarishta	4.5-9.0 % v/v

Sr. No.	Formulations	Percentage
4.	Lohasava	5.0-8.0 % v/v
5.	Ushiraasva	6.0-8.0 % v/v
6.	Kumaryaasva	5.0-10.0 % v/v

The controlled alcohol content in Sandhana Kalpana formulations is crucial for enhancing both the medicinal potency and preservation of the final product.

Draksharista

Reference: AFI, Part- 01

द्राक्षातुलार्धं द्विद्रोणे जलस्य विपचेत् सुधीः।।
पादशेषे कषाये च पूते शीते विनिक्षिपेत्।
गुडस्य द्वितुलां तत्र त्वगेलापत्रकेशरम्।।
प्रियङ्गुमरिचं कृष्णा विडङ्गं चेति चूर्णयेत्।
पृथक्पलोन्मितैर्भागैस्ततो भाण्डे निधापयेत्।।
समन्ततो धट्टयित्वा पिधेज्जातरसं ततः।
उरःक्षतं क्षयं हन्ति कास श्वासगलामयान्।।
द्राक्षारिष्टाह्वयः प्रोक्तो बलकृन्मलशोधनः।

(Sha.S.M.Kh. 10/69-72½)

Ingredients Used

Drug Name	Part Used	Proportion
Draksha	Dr. Fr.	2.400 kg
Water for Decoction	–	49.1521 L
Reduced to	–	12.288 L
Guda	–	9.600 Kg
Prakshepa Dravyas		
Tvak	St. Bk.	48 gms
Ela	Sd.	48 gms
Patra	Lf.	48 gms
Nagakesara	Stmn.	48 gms
Priyangu	Fl.	48 gms
Maricha	Fr.	48 gms
Pippali	Fr.	48 gms
Vidanga	Fr.	48 gms
Dhataki	Fl.	48 gms

Procedure

1. Prepare a coarse powder of all the dravyas.
2. Add water to the Draksha and soak the mixture overnight.
3. The next morning, add 50 liters of water to the soaked mixture.
4. Boil the mixture and reduce it to one-fourth of its original volume and filter the kvatha (decoction).
5. Take a Sandhana Patra (fermentation vessel) and smear it with Sarshapa (mustard) oil. Pour the filtered kvatha into the Sandhana Patra.
6. Add melted Guda (jaggery) to the kvatha, along with all the remaining dravyas in the form of Yavakuta Churna (coarse powder).
7. Close the Sandhana Patra with Sandhi-bandhana (sealing the lid) and allow the mixture to ferment properly.
8. Once it attain sandhana lakshana, then filter the final product.
9. Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency.

Dose: 12 to 24 ml

Anupana: Water

Therapeutic Indications: Agnimandya, Kasa, Shavasa, Urahkshata, Kshaya, Malashodhaka, Daurbalya, Gala Roga.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Determination of Quality Standards for Draksharishta, a Polyherbal Ayurvedic Formulation	Divya Pillai Sunandan Divatia School of Science, SVKM's NMIMS University, Vile Parle (W), Mumbai-400 056, India	The study aims to assess the quality control parameters of plant samples used in preparing draksahrishta. These parameters include organoleptic characters, microscopic analysis, physicochemical properties, phytochemical analysis, and the development of TLC profiles and HPTLC fingerprints, following WHO, Indian Pharmacopoeia, and Ayurvedic Pharmacopoeia guidelines.
2.	The Pharmaceutical evaluation of Drakshar-ishta	Dr. Manoj Kumar Samantaray- Professor, Department of PG Studies in Rasashastra & Bhaisha-jya Kalpana, Sri Sri College of Ayurvedic Science and Research, Bengaluru, Karnataka, India	The sample consisted of five samples (a, b, c, d, e). In all samples, the sweetening substance was added at once, resulting in a syrupy consistency and a slow onset of fermentation. Fermentation began after one and half months for all samples except sample D, which aligns with the typical fermentation period for most Asavarishta preparations.

Sr. No.	Article Name	Author Name	Result
3.	Antimicrobial Activity of Draksharishta Prepared by Traditional and Modern Methods	Preeti Tiwari, Head of Department of Pharmacognosy, Dr. K. N. Modi Institute of Pharmaceutical Education and Research, Modinagar, Uttar Pradesh, India.	The study found that Draksharishta preparations (Draksharishta-T, Draksharishta-M, and marketed Draksharishta) showed notable antibacterial activity against common human pathogens. This suggests potential for further research in developing potent, naturally derived antibiotics.

Usheerasava

Reference: AFI Part- 01

उशीरं बालकं पद्मं काश्मर्यं नीलमुत्पलम्।
प्रियङ्गु पद्मकं लोध्रं मञ्जिष्ठां धन्वयासकम्।।
पाठां किराततिक्तञ्च न्यग्रोधोदुम्बरं शटीम्।
पर्पटं पुण्डरीकं च पटोलं काञ्चनारकम्।।
जम्बूशाल्मलिनिर्यासं प्रत्येकं पलसम्मितम्।
भागांस्तु चूर्णितान् कृत्वा द्राक्षायाः पलविंशतिम्।।
धातकीं षोडशपलां जलद्रोणद्वये क्षिपेत्।
शर्करायास्तुलां दत्त्वा क्षौद्रस्यार्द्धतुलां तथा।।
मासैकं संस्थापयेद् भाण्डे मांसीमरिचधूपिते।
उशीरासव इत्येष रक्तपित्तविनाशनः।।
पाण्डुकुष्ठप्रमेहार्शः कृमिशोथहरस्तथा।।

(B.R., Raktapitt. 13/162-166)

Ingredients Used

Drug Name	Part Used	Proportion
Ushira	Rt.	48 gms
Hrivera	Rt.	48 gms
Padma	Fl.	48 gms
Gambhari	St. Bk.	48 gms
Utpala	Fl.	48 gms
Priyangu	Fl.	48 gms
Padmaka	St.	48 gms
Lodhra	St. Bk.	48 gms
Manjishtha	Rt.	48 gms
Dhanvayasa	Pl.	48 gms
Patha	Rt.	48 gms
Kiratatikta	Pl.	48 gms
Nyagrodha	St. Bk.	48 gms
Udumbara	St. Bk.	48 gms
Sati	Rz.	48 gms
Parpata	Pl.	48 gms
Kamala	Fl.	48 gms
Patola	Lf.	48 gms
Kanchanara	St. Bk.	48 gms
Jambu	St. Bk.	48 gms
Shalmali	Exd.	48 gms
Draksha	Dr. Fr.	960 gms
Dhataki	Fl.	768 gms
Water	–	24.576 l
Sharkara	–	4.800 kg
Madhu	–	2.400 kg
Jatamansi	Rt.	Q.S. for Dhupana
Maricha	Fr.	Q.S. for Dhupana

Procedure

1. Prepare a coarse powder of all the dravyas
2. Take a Sandhana Patra (fermentation vessel) and smear it with Sarshapa (mustard) oil. Pour the water into the Sandhana Patra.
3. Add Sharkara, Madhu, along with all the remaining dravyas in the form of Yavakuta Churna (coarse powder).
4. Close the Sandhana Patra with Sandhi-bandhana (sealing the lid) and allow the mixture to ferment properly.
5. Once it attain sandhana lakshana, then filter the final product.
6. Store it in a clean, dry, airtight container. Keep the container in a cool, dark place to preserve the potency.

Dose: 12 to 24 ml

Therapeutic Indications: Raktapitta, Pandu, Kushtha, Prameha, Arsha, Krimi, Shotha.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Review on Ushirasava (fermented traditional medicine of Ayurveda)	Vd. Jayashree Neve 1, Post Graduate Scholar, , Department of Rasashashtra and Bhaishajya Kalpana, D. Y. Patil College of Ayurveda & Research Centre, Pimpri, Pune, Maharashtra, India	Ushirasava is a potent, cooling medicine effective for various bleeding disorders. It pacifies Pitta, acts as a diuretic, and purifies the blood. With approximately 4-9% self-generated alcohol, it's primarily used for Raktapitta disorders as per classical texts. While variations exist in ingredients and quantities, it's generally safe with no reported side effects.

Sr. No.	Article Name	Author Name	Result
2.	Ushirasava-Physicochemical Standardization and Quantitative Estimation of Some Bioactives	Dr. Tabassum Khan Professor, Department of Pharmaceutical Chemistry & Quality Assurance, SVKM's Dr. Bhanuben Nanavati College of Pharmacy, Mumbai - 400056, Maharashtra, India.	This study aimed to develop and validate an HPTLC method for quantifying luteolin and rubiadin in Ushirasava formulations, following established protocols. The method was validated according to ICH-Q2 (R1) guidelines. Results were compared with Ayurvedic Pharmacopoeia of India specifications. This validated HPTLC method enables routine quality control of Ushirasava formulations.

Research Updates on Sandhana Kalpana

Sr. No.	Article Name	Author Name	Result
1.	A Review Article on Sandhan Kalpana	Sharuti Sharma, P.G. Scholar, P.G. Department of Rasa Shastra and Bhaishajya Kalpana Uttarakhand Ayurved University, Rishikul Campus Haridwar, Uttarakhand, India.	This study evaluates the preparation and significance of Sandhana Kalpana in Ayurvedic practice. Key concerns regarding preparation requirements are discussed. Preparation details for Varuni, Sura, and other Amla Vargiya Sandhan Kalpas are insufficiently described. Aspects like vessel material, fermenting agents, and temperature control need more clarity. The process for Asava-Arishta is thoroughly detailed in classical Ayurvedic texts.
2.	Sandhana Kalpana: A progressive review	Dileep Singh Baghel, Department of Ayurvedic Pharmacy, School of Pharmaceutical Sciences, Lovely Professional University, Jalandhar, Punjab, India.	This study highlights the significant advantages of Sandhana Kalpana in Ayurveda, offering both medicinal and nutritional benefits. Biochemically, it involves incomplete oxidation through fermentation, where microbes convert glucose into carbon dioxide and alcohol in the absence of oxygen. The review aims to provide foundational information to enhance the knowledge of academicians and researchers interested in this dosage form.
3.	A Study On Sandhan Kalpana In Ayurveda	Dr.Ravneet Kaur Chahal Lecturer Department of Rasashastra & Bhaishajya Kalpana Government Ayurvedic College Patiala, Punjab	This study highlights the growing use of fermented Ayurvedic preparations, which are now widely employed to boost appetite, physical strength, mental health, and treat insomnia. Sura aids lactating mothers with low milk production (Stanyakshya), Shukta Kalpana addresses parasitic infections and urinary disorders, Klama treats Vata-Kapha conditions, and Sidhu is used in medicated enemas (Asthapanabasti). Their use has significantly increased compared to the past.

Market Survey

1. **Product Understanding and Consumer Education**:
   - Develop educational content that explains the unique benefits of Sandhana Kalpana products to consumers. Highlight the benefits of products like Asava and Arishta, such as digestive health, immunity enhancement, and detoxification.
   - Provide information on the traditional preparation methods and their significance in Ayurveda to build authenticity and consumer trust.
2. **Market Segmentation Details**:
   - **Geographical Insights**: Focus on regions with a higher prevalence of Ayurveda, such as India, Nepal, and Sri Lanka. Also, consider regions where Ayurveda is gaining momentum like North America, Europe, and Australia, targeting health-conscious consumers and the diaspora.
   - **Demographics and Psychographics**: Segment the market by health-conscious individuals, especially those interested in preventive health and wellness. Consider age groups (25-45) that are more inclined towards natural health remedies and can afford premium products.
3. **Target Audience Analysis**:
   - **Develop personas for different consumer groups**: Ayurvedic practitioners who recommend these products, wellness enthusiasts, and patients looking for alternative treatments. Tailor marketing strategies to these personas, such as offering professional discounts to practitioners or subscription plans to regular consumers.
4. **Deep Dive into Consumer Preferences**:
   - Conduct consumer surveys and focus groups to identify key factors influencing purchase decisions, such as taste, product packaging, perceived quality, and trust in the brand.
   - Assess the importance of factors like organic certification, ease of use, price sensitivity, and brand reputation in consumer choice.
5. **Analyzing Market Trends**:
   - Digital Marketing Opportunities: Leverage digital marketing, e-commerce platforms, and influencer partnerships to target younger, health-conscious consumers.
   - Highlight the probiotic properties of fermented Ayurvedic products, tapping into the growing trend of probiotic health supplements.
6. **Competitive Landscape Overview**:
   - Perform a SWOT analysis of key players like Dabur, Himalaya, Baidyanath, and Zandu. Examine their product offerings, pricing models, distribution networks, and unique selling points (USPs).
   - Identify gaps in the current market that new products or brands could fill, such as organic or vegan-certified formulations, or products tailored to specific health conditions.
7. **Regulatory Environment and Compliance**:
   - Keep up to date with local and international regulations governing the production and sale of Ayurvedic products. Ensure compliance with labeling requirements, health claims, and ingredient approvals.
   - Promote certifications like GMP (Good Manufacturing Practices) and ISO (International Organization for Standardization) to build credibility and trust among consumers.
8. **Optimizing Distribution Channels**:
   - Explore multi-channel distribution strategies, including partnerships with Ayurveda clinics, healthy stores, pharmacies, and online marketplaces.
   - Analyze the effectiveness of each channel and identify opportunities for expanding reach, such as launching direct-to-consumer online sales or collaborating with wellness centers.
9. **Identifying Challenges and Opportunities**:
   - Address common consumer misconceptions and skepticism towards Ayurveda through educational campaigns, testimonials, and scientific research.
   - Leverage opportunities in increasing demand for natural remedies by positioning Sandhana Kalpana as a unique solution that blends traditional wisdom with modern health benefits.
10. **Data Collection and Research Methods**:
    - Utilize a mix of qualitative and quantitative research methods: online surveys for broad consumer insights, focus groups for in-depth understanding, and interviews with practitioners for professional perspectives.
    - Analyze secondary data sources, including market reports and sales data, to understand existing market dynamics and identify trends.

Pathya Kalpana

Introduction

Pathya Kalpana in Ayurveda refers to the concept of a suitable diet and lifestyle regimen designed to complement specific treatments and maintain health.

It is not just about food intake but also about following appropriate routines, activities, and mental attitudes to promote healing, balance the doshas (Vata, Pitta, Kapha), and support the body's natural functions.

A carefully planned pathya ensures that medicines work effectively and enhances recovery, playing an indispensable role in the prevention and management of diseases.

Acharya Kashyapa emphasizes the significance of diet (Ahara) as the supreme medicine, referring to it as Mahabheshaja (the ultimate remedy).

Without adhering to a proper diet regimen (Pathya), even the best medicines cannot benefit the patient. Pathya play a crucial role in maintaining good health by keeping the sapta dhatu (seven bodily tissues) and tri dosha (three bio-energies) in a balanced state, which are essential elements for overall well-being.

Definition

पथ्यं पथोऽनपेतं यद्यच्चोक्तं मनसः प्रियम्। (Ch.Su. 25/45)
(पथः शरीरमार्गात्य अनपेतम् अनपकारकम्)
स्वस्थस्वास्थ्यरक्षणम् आतुरव्याधिपरिमोक्षश्चेति पन्थाः तस्मादनपेतं पथ्यम्। (Ch.Su. 25/45, Chakrapani)

According to Acharya Charaka, the term Pathya is derived from "Patha," meaning the various channels within the body, and "Anapetam," meaning not harmful. Thus, any food or regimen that does not harm these bodily channels and, on the contrary, soothes and supports the body's functioning is referred to as Pathya.

Synonyms

1. **Hita Ahara**: Beneficial food that balances the doshas.
2. **Satmya**: Foods compatible with one's constitution.
3. **Svastahitakara**: Food conducive to maintaining health.
4. **Upashaya**: Therapeutic foods that alleviate symptoms.
5. **Svasthaparipalaka**: Food that sustains and promotes overall health.
6. **Svastha Aurjaskara**: Food that enhances Ojas (vital energy).
7. **Dhatu Avirodhi**: Food that doesn't disturb bodily tissues.
8. **Sukhaparinamakara**: Food that digests easily and causes no discomfort.
9. **Chikitsa**: Food as therapy for treating illnesses.
10. **Mahabheshaja**: Food as the supreme form of medicine.
11. **Dhatu Samyakara**: Food that maintains the balance of bodily tissues.

Significance of Pathya

तुष्टिः पुष्टिर्धृतिर्बुद्धिरुत्साहः पौरुषं बलम्।।
सौस्वर्यं ओजस्तेजश्च जीवितं प्रतिभा प्रभा।
आहारादेव जायन्ते एवमाद्या गुणा नृणाम्।।
तदात्मवान् हितमितं काले भुञ्जीत षड्रसम्।

(Ka.S.Khil. 4/11-12)

1. **तुष्टिः (Tushti):** Satisfaction or contentment. Proper food brings a sense of fulfillment and satisfaction to the mind and body.
2. **पुष्टि (Pushti):** Nourishment. Well-balanced food leads to the nourishment of the body and maintains physical health.
3. **धृति (Dhriti):** Steadiness or strength. Appropriate food provides strength and stability, both mentally and physically.
4. **बुद्धिः (Buddhi):** Intelligence. Food directly influences intellectual capacity and cognitive functions.
5. **उत्साह (Utsaha):** Enthusiasm or energy. Food is a source of vitality, giving rise to enthusiasm for action.
6. **पौरुषम् (Paurusham):** Courage or valor. The right diet contributes to bravery and the ability to face challenges.
7. **बलम् (Balam):** Physical strength. Adequate and proper food intake strengthens the body, supporting endurance and resilience.
8. **सौस्वर्यम् (Sausvaryam):** Good voice. Food influences the quality of one's voice, ensuring it remains melodious and strong.
9. **ओजः (Ojas):** Vital energy. Proper nourishment leads to the production of 'Ojas', the essence of vitality and immunity.
10. **तेजः (Tejas):** Radiance or brilliance. Food gives rise to inner and outer radiance, a reflection of good health.
11. **जीवितम् (Jivitam):** Life. Food is the foundation of life, sustaining it through nourishment.
12. **प्रतिभा (Pratibha):** Perception or insight. The right food enhances clarity of perception and understanding.
13. **प्रभा (Prabha):** Luster or glow. Healthy food contributes to the natural glow or aura of a person.

Types

Pathya Kalpana was classified by acharya Sushruta into the following four categories (Su.Su. 46/344)

- Manda
- Peya
- Yavagu
- Vilepi

Manda

Definition

सिक्थैर्विरहितो मण्डः। (Su.Su. 46/344)

When rice is properly boiled with water, the liquid portion obtained is called Manda.

General Method of Preparation

नीरे चतुर्दशगुणे सिद्धो मण्डस्त्वसिक्थकः।।
शुण्ठीसैन्धवसंयुक्तः पाचनो दीपनः परः।

(Sha.S.M.Kh. 2/170-171)

1. Take 1 part of rice (tandula) in a clean stainless steel vessel.
2. Add 14 parts of water to the vessel.
3. Place the vessel on mild heat and cook the mixture until the rice particles are fully cooked.
4. Once the rice is cooked, filter the mixture to separate the liquid part.
5. The filtered liquid, without any solid rice particles, is the manda and is ready for use.

Types

1. Vatya Manda
2. Laja Manda
3. Ashtaguna Manda

Prakshepa dravya: Shunthi, Saindhava Lavana
Properties: Tridoshaghna
Indication: Pachana, Dipana

Peya

Definition

पेया सिक्थसमन्विता। (Su.Su. 46/344)

- Paya refers, a light, semi-liquid form of food often used in Ayurveda.
- Peya is a thin gruel, typically prepared by boiling rice or other grains with water. It is more fluid than manda and is easier to digest.
- Peya should have a consistency similar to siktha, which means it is slightly thicker than water but still very fluid and smooth in texture.

General Method of Preparation

द्वयधिका स्वल्पसिक्था चतुर्दशगुणे जले।।
सिद्धा पेया बुधैः ज्ञेया... (Sha.S.M.Kh. 2/167)

1. Take 1 part of rice (tandula) in a clean stainless steel vessel.
2. Add 14 parts of water to the vessel.
3. Place the vessel on mild heat and cook the mixture until the rice particles are fully cooked.
4. Once cooked, the mixture should have a thin, gruel-like consistency with more liquid and less rice. This preparation is known as Peya.
5. Filter the cooked mixture to separate the liquid part.

Properties

क्षुत्तृष्णाग्लानिदौर्बल्यकुक्षिरोगज्वरापहा।
स्वेदाग्निजननी पेया। (Ch.Su. 27/250)

- Peya is Laghu, Dipana, Vasti shodhaka, Vatanulomaka, Dhatu-Paushtikara
- Alleviates Trishna, Hunger and Fatigue.
- Peya is Sveda Janana and useful in Jvara and Kukshi - Roga

Indication: Jvara, Atisara.

Yavagu

Definition

यवागू विरलद्रवा। (Su.Su. 46/344)

Yavagu having more portion of soild part and lesser portion of liquid part.

General Method of Preparation

यवागूं षड्गुणे पचेत्। (Su.Su. 46/344 D.T.)

1. Take 1 part of rice (tandula) in a clean stainless steel vessel.
2. Add 6 parts of water to the vessel.
3. Place the vessel on mild heat and cook the mixture until the rice particles are fully cooked.

साध्यं चतुष्पलं द्रव्यं चतुःततक्याधेनार्थशिष्टेनयवागूंसाधयेद्यनां षष्टिपलेऽम्बुनि। (Sha.S.M.Kh. 2/52)

1. Take 4 pala of Drava with 64 pala of water in a clean vessel.
2. Boil over moderate heat until half the water evaporates.
3. The remaining liquid should have a thick, Ghana consistency, indicating that Yavagu is ready.
4. Remove from heat and let it cool before serving.

Indication: Manda Jatharagni, Unmada, Trishna.

Vilepi

Definition

विलेपी बहुसिक्था। (Su.Su. 46/344)

General Method of Preparation

विलेपी घनसिक्था स्यात्सिद्धा नीरे चतुर्गुणे।
तर्पणी बृंहणी हृद्या मधुरा पित्तनाशिनी।

(Sha.S.M.Kh. 2/166-167)

1. In a clean stainless steel vessel, combine 1 part of Tandula with 4 parts of water.
2. Place the vessel over mild heat.
3. Boil the mixture until all the rice particles are thoroughly cooked.

4. Ensure the preparation reaches a thicker consistency (Ghanasiktha).
5. Allow it to cool slightly before use.

Properties: Madhura, Pitta-shamaka, Laghu

Indication: Tarpaka, Bhrimhaka, Hridaya

Anna

Synonyms

भक्तं अन्नं कूरं अन्धोभिस्सा दीदिवि ओदनः।।

(Kai.Deva.Nig.Krit 5/1)

Bhakta, Anna, Kura, Andha, Bhissa and Didivi.

General Method of Preparation

जले चतुर्दशगुणे तण्डुलानां चतुष्पलम्।
विपचेत् स्रावयेन्मण्डं स भक्तो मधुरो लघुः।

(Sha.S.M.Kh. 2/169–170)

1. Take 4 part of rice (tandula) in a clean stainless steel vessel.
2. Add 14 parts of water to the vessel.
3. Place the vessel on mild heat and cook the mixture until the rice particles are fully cooked.
4. Once the rice is cooked, filter the mixture to separate the liquid part.
5. The filtered liquid, without any solid rice particles, is the Anna and is ready for use.

Different References

1. Bhavaprakasha Kritannavarga- 1:5 (Rice: Water)
2. Kaiyadeva Nighantu Kritannavarga- 1:10 (Rice: Water)
3. Sushruta Samhita- 1: 4 (Rice: Water)

Properties: Madhura, Laghu

Krashara

General Method of Preparation

तण्डुलादालिसम्मिश्रा लवणार्द्रकहिगुभिः।
संयुक्ता सलिले सिद्धा कृशरा कथिता बुधैः।। (Bh.Pra.Kritt)

1. Wash the rice and pulses thoroughly in clean water until the water runs clear. This helps to remove any dirt and excess starch.
2. Soak the washed rice and pulses together in water for about 30-60 minutes. This softens them and reduces the cooking time.
3. In a pot, add the soaked rice and pulses along with fresh water (4-5 cups).
4. Bring the mixture to a boil over medium heat.
5. Once it starts boiling, reduce the heat to low and cover the pot. Allow it to simmer until the rice and pulses are well cooked and soft (about 20-30 minutes). Stir occasionally to prevent sticking.
6. Once the rice and pulses are cooked, add the grated or chopped ginger and salt to the mixture.
7. Stir well to combine all ingredients.
8. Let it cook for an additional 5-10 minutes to allow the flavors to meld.
9. Check the consistency; it should be somewhat porridge-like. You can adjust the consistency by adding more water if desired.
10. Taste and adjust the salt as necessary.
11. Serve the Krishara warm. It can be consumed alone or with a side of ghee (clarified butter) for added nourishment.

खिच्चख्य तु यवगूः कृता तण्डुलाशिग्भिजैः।
तद्धत् खिच्चा गुणैः किञ्चित् स्वधान्यगुणमवहेत्।।

(Kai.Deva.Nig.Krit.)

1. Thoroughly wash 1 part rice and 1 part pulses until the water runs clear.
2. Soak the washed rice and pulses in water for about 30 minutes.
3. Heat 1-2 tablespoons of ghee (sneha) in a large pot over medium heat.
4. Sauté 1-2 inches of grated ginger (ärdraka) and a pinch of asafetida (hingu) until fragrant.
5. Add the washed rice and pulses, stirring to coat with fat and spices.
6. Pour in 6 parts water (e.g., 600 mL), and add salt (saindhava lavana) and 1/4 teaspoon turmeric (haridra). Stir to combine.
7. Bring to a boil, then reduce heat to low, cover, and simmer for 20-30 minutes until fully cooked and solid in consistency, stirring occasionally.
8. Check for softness; add water if too thick.
9. Serve warm, optionally garnished with fresh herbs or a drizzle of ghee.

Properties

कफपित्तकरी बल्या कृशराऽनिलनाशनी । (Su.Su. 46/345)

1. Kapha-Pittakaraka (alleviates kapha and pitta dosha)
2. Balya (provides energy)
3. Vata-Shamaka (mitigates vata dosha).

Yusha

Reference

कल्कद्रव्यपलं शुण्ठी पिप्पली चार्धकार्षिकी।
वारिप्रस्थेन विपचेत् स द्रवो यूष उच्यते।।

(Sha.S.M.Kh. 2/154)

Ingredients Used

Sr. No.	Dravya Name	Quantity
1.	Aushadha dravya kalka	1 Pala
2.	Shunthi Churna	½ Pala
3.	Pippali Churna	½ Pala
4.	Water	1 Prastha

General Method of Preparation

1. Take all the required ingredients (such as rice, pulses, and spices like ginger, salt, and turmeric) in a clean stainless steel vessel.
2. Place the vessel on a low flame and cook the mixture gently.
3. Stir occasionally to prevent sticking, and continue cooking until a thin, gruel-like consistency is achieved.
4. Once the gruel is cooked, remove the vessel from the heat and allow it to cool naturally to a warm or room temperature.
5. The prepared Yusha can now be consumed. It is recommended for both therapeutic and dietetic purposes.

Types

Kashyapa Khila Sathana-04

1. According to Rasa- 50 in numbers
2. According to Kritakrita- 03 in number
3. According to Virya- 03 in numbers
4. According to Dosha- 75 in numbers

Properties

रोचनो दीपनो वृष्यः स्वरवर्णबलाग्निकृत्।
प्रस्वेदजननो मुख्यस्तुष्टिपुष्टिसुखावहः।।
यूषः सेहोष्णभवाच्चव वातं स्नेहकषायतः।
पित्तं कफ कटुष्णात्वात् संस्काराच्च नियच्छति।।

(Ka.S.Khil. 4/15–16)

Dipana, Ruchikara, Vrishya, Svarya, Balya, Varnya, Sveda jannana, Tushtikara, Pushtikara, Kanta-Kaphahara, Vata-Pitta-Kapha Shamaka.

Takra

Introduction

1. Takra, most commonly known as buttermilk, is a widely used dietary product in Ayurveda.
2. Ayurvedic texts praise Takra for its benefits, especially for the digestive system.
3. It is highly regarded for its therapeutic properties, helping with various digestive disorders.
4. Takra acts not only as a primary medicine in certain clinical conditions but also as an Anupana (vehicle) for different medicines.
5. Acharya Charaka compares Takra to Amruta (Nectar) on Earth, highlighting its importance. According to Vaidyakiya Subhashita Sahityam, while the gods in heaven attained immortality through Amrita, humans receive Takra as their "nectar" on Earth for health and longevity.
6. It is also said that even Indra, the King of Gods, suffered from Kushtha (skin disease) because he lacked Takra.
7. Traditionally, Takra is made by churning curd (yogurt) with water in a specific ratio. This detailed preparation of buttermilk, known as Takra Kalpana, is a crucial dietary and medicinal element in Ayurveda, valued for its rejuvenating and digestive qualities.

Synonyms

दण्डाहतं कालशेयं गोरसश्च विलोडितम्।

(Kai.Deva.Nig.Takra.)

1. Dandahata
2. Kaalasheya
3. Gorasa
4. Vilihita

Types

रूक्षमर्धोद्धृतस्नेहं यतश्चानुद्धृतं घृतम्।
तक्रं दोषाग्निबलवित्त्रिविधं तत्प्रयोजयेत्।। (Ch.Chi. 14/84)

Sr. No.	Takra Type	Process	Indication
1.	Ruksha	Butter removed from the curds	Kapha Dosha
2.	Adha-Sneha Yukta	Half the butter left with the curds	Pitta Dosha
3.	Pura-Sneha Yukta	Butter left with the curds without removing any	Vata Dosha

घोले तु मथित तर्कमुदश्वच्छिछकाऽपि च। (Bh.P. Takra)

Sr. No.	Takra Type	Process
1.	Ghola	Curd churned without adding water and no removal of butter
2.	Mathitha	Curd churned without adding water and removal of butter
3.	Katvara	Curd churned by adding quarter part of water and butter is removed
4.	Udashvita	Curd churned by adding half part of water and butter is not removed
5.	Chacchika	Curd churned and remove butter then add sufficient amount of water (Most Diluter Form)

Properties

तक्रं ग्राहि कषायाम्लं स्वादु पाकरसं लघु।
वीर्योष्णं दीपनं वृष्यं प्रीणनं वातनाशनम्।। (Bh.P. Takra, 4/7)

- **Rasa**: Kashaya, Amla, Madhura.
- **Guna**: Laghu, Ruksha
- **Virya**: Ushna
- **Vipaka**: Madhura
- **Karma**: Dipana, Vrishya, Prinana, Vatanashka

Indication

शीतकाले वह्निमान्द्ये विषमाग्नौ कफामये।
स्रोतोऽवरोधे कोष्ठस्थदुष्टवायौ गरामये।।
गुल्मेऽर्शसि ग्रहण्यां च तक्रसेवाऽमृतोपमम्।।
(Kai.Deva.Nig.Takra 248-49)

Shitakala, Agnimandya, Vishamagni, Kaphaja Roga, Sroto- Avarodha, Koshthagata Vata, Garavisha, Gulma, Arsha, Grahani, Shopha, Atisara, Pandu, Vishama Jvara, Mutra-krichchhra etc.

Contraindication

न तक्रं शस्यते ग्रीष्मे शरत्काले क्षते व्रणे।
काश्यें दाहे भ्रमे शोषे मूर्च्छायां रक्तपित्तयोः।।
(Kai.Deva.Nig.Takra 247)

Kshata, Vrana, Karsha, Daha, Bhrama, Shosha, Murchchha and Raktapitta.

Khada

Introduction

खडकाम्बलिकौ यूषविशेषौ। (Su.Su. 46/376, Arundatta)

Khada and kambalika are the two special preparations of 'yusa' prepared by 'takra' and any 'dhanya vishesha.

Detailed explanation about these preparations is provided by commentators 'Dalhana' and 'Jejjata'.

Types

तत्र खडो द्विविधः– सतक्रशमीधान्यः, सतक्रशाकश्च।।
(Su.Su. 46/376, डल्ह०)

Khada is of two types:

1. Satakra Shamidhanya Khada
2. Satakra Shaka Khada

General Method of Preparation

1. Satakra Shamidhanya Khada

Procedure

1. Take 1 part of takra in an earthen vessel.
2. Add 1/16th part of the selected samidhanya (such as green gram, peas, Bengal gram, black gram, or beans) into the vessel.
3. Place the vessel on mild heat and cook the mixture, stirring occasionally.
4. Continue cooking until the liquid is reduced to half or 1/4th of its original volume.
5. Once the desired consistency is achieved, add the required quantity of fried jiraka powder, marica powder, salt, and any other spices to taste.
6. Mix well and allow it to simmer for a few more minutes.
7. Remove from heat and serve warm.

2. Satakra Shaka Khada

Procedure

1. Take 1 part of takra (buttermilk) in an earthen vessel.
2. Prepare a herbal combination (yoga) with Kapittha, Takra, Changeri, Maricha, Ajaji, and Chitraka in a ratio of 1/16th part to the buttermilk.
3. Add this herbal mixture to the takra in the vessel.
4. Place the vessel on mild heat and cook the mixture, allowing it to reduce to 1/2 or 1/4th of its original volume.
5. Once the desired reduction is achieved, add salt and other spices as per taste.
6. Stir well and let it simmer for a few more minutes to ensure all ingredients are well combined.
7. Remove from heat and serve warm.

Properties: Agnidipaka, Pachaka, Ruchikara, Sangrahi, Kapha- Vitta Doshahara.

Kambalika

Introduction

खडकाम्बलिकौ यूषविशेषौ। (Su.Su. 46/376, Arundatta)

Khada and Kambalika are the two special preparations of 'yusha' prepared by 'takra' and any 'dhanya vishesha.

Detailed explanation about these preparations is provided by commentators 'Dalhana' and 'Jejjata.

General Method of Preparation

दधिमस्त्वम्लसिद्धस्तु यूषः काम्बलिकः स्मृतः।।
(Su.Su. 46/375, Jejjat)

1. In a pot, take 1 part of amla dadhi mastu (sour supernatant liquid from curd).
2. Add 1/8th part of pulses like mudga (green gram) or masha (black gram) to the liquid.
3. Cook the mixture over a mild flame until the pulses are well-cooked and the consistency resembles yusha (a thin soup).
4. Once cooked, add the required amount of sneha (ghee or oil) and lavana (salt).
5. Stir in jiraka (cumin seeds), nimbu svarasa (lemon juice), and spices like twak (cinnamon), ela (cardamom), and patra (bay leaf).
6. Allow the mixture to simmer for a few more minutes to absorb the flavors.
7. Remove from heat and serve warm.

Properties: Agnidipaka, Pachaka, Ruchikara, Sangrahi, Kapha- Vitta Doshahara.

Raga Shadava

Definition

- Raga is a traditional preparation made by blending the juices of vrikshamla (Garcinia indica), parushaka (Grewia asiatica), and jambu (black plum). To this mixture, the required quantity of mustard, sugar, and salt is added, creating a tangy and flavorful condiment or dish used in Ayurvedic dietary practices.
- Shadava is a preparation made by mixing the juice of sweet or citrus fruits with a small amount of salt to enhance the taste. Examples include Kapittha Shadava (made from wood apple juice) and Draksha Shadava (made from grape juice). This dish is often used in Ayurvedic dietary practices.

General Method of Preparation

कपित्थं तु गुडोपेतं सहकारफलं नवम्।
तैलनागरयुक्तं च विज्ञेयो रागषाडवः।।
(Kai.Deva.Nig.Krit., p. 417)

1. Take the pulp of kapittha phala (wood apple) and mash it thoroughly.
2. Add grated guda (jaggery) to the mashed pulp and mix well.
3. Peel and chop the unripe mango into small pieces, then add it to the mixture.
4. Heat oil in a pan and add sunthi (dry ginger) powder to it, sautéing for a few minutes until aromatic.
5. Add the oil and sautéed Shunthi to the fruit mixture and stir well to combine all the ingredients.
6. Allow the preparation to sit for a while to let the flavors blend.
7. Serve as a tangy and sweet Raga-Shadava.

Properties

रुचिष्यो लघुपाकश्च दोषाणां चाविरोधाकृत्।। (Su.Su. 46/368)
लघवो बृंहणा वृष्या ह्रद्या रोचनदीपनाः। (Su.Su. 46/382)

Ruchikara, Laghu, Brumhana, vrishya, Rochaka and Dipana.

Indication

तृष्णामूर्च्छाभ्रमच्छर्दिश्रमघ्ना रागषाडवाः।। (Su.Su. 46/383)

Murchchha, Bhrama, Chhardi and Shrama.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pathya Aahara Kalpana: A Review	Rajendra Garg, Dept. of Panchkarma, National Institute of Ayurveda, Jaipur, Rajasthan, India	This study emphasizes that the primary aim of Pathya Aahara Kalpana (therapeutic diet preparation) is to highlight the significant role of diet in maintaining physical health and treating various conditions related to Dosha, Dhatu, Mala, and Agni in individuals, as well as promoting mental well-being. It underscores the importance of understanding Aahara (food) and its benefits, emphasizing that every individual should possess proper knowledge about food and its role in overall health for optimal well-being.

Sr. No.	Article Name	Author Name	Result
2.	A Clinical Approach Of Pathya Kalpana In Prameha: A Review	Pavithra NK, PG Scholar, Department of Swasthavritta, S.J.G. Ayurvedic Medical College and Hospital, Koppal, Karnataka, India.	This paper emphasizes that Prameha (diabetes) requires the incorporation of ahara (diet) as a crucial tool for maintaining quality of life, given its classification as a Yapya Vyadhi (chronic condition). Dietary components beneficial for managing prameha possess properties that are Kaphavata hara (pacifying Kapha and Vata doshas), as well as laghu (light), ruksha (dry), and lekhana (scraping) qualities. Foods like yava (barley), godhuma (wheat), shali (rice), and mudga (green gram) exemplify these attributes. Incorporating pathya kalpana (therapeutic dietary preparations) into daily meals is essential for preventing and managing prameha, promoting overall health and well-being.
3.	Concept of Nutraceuticals And Pathya Kalpana ; A Review	Abhijeet Kumar, Ug Scholar , Faculty of Ayurveda, IMS, RGSC,BHU, Mirzapur, Uttar Pradesh, India	This review article compiles the concept of nutraceuticals and concisely discusses the implications and importance of pathya kalpana (therapeutic dietary preparations). It aims to provide insights that can be easily adapted by individuals in their daily lives.

Market survey of Dietary Supplements

A market survey of dietary supplements in Ayurveda can provide valuable insights into current trends, consumer preferences, product types, key players, and the potential for future growth.

1. **Market Overview**
   - **Market Size and Growth**: The Ayurvedic dietary supplements market has been growing due to the increasing demand for natural and holistic health solutions. It is part of the larger nutraceutical and herbal supplement industry, which is projected to continue expanding globally, particularly in India, the US, and Europe.

Key Segments:

- **By Product Type**: Supplements for digestion, immunity, cognitive function, joint health, and general wellness.
- **By Dosage Forms**: Tablets, capsules, powders, syrups, gummies, and oils.
- **By Ingredients**: Popular Ayurvedic herbs include Ashwagandha, Turmeric, Triphala, Brahmi, Shatavari, Amla, and Guggul.

2. **Consumer Preferences**
   - **Natural and Organic**: Consumers are increasingly looking for natural, organic, and chemical-free products.
   - **Preventive Health**: There is a growing trend toward preventive health measures, with people using supplements for immunity, mental health (stress, anxiety), and chronic conditions like diabetes and hypertension.
   - **Customization**: Some companies are offering personalized supplements based on the individual's body type (dosha) in line with Ayurveda's personalized approach to health.
3. **Key Players**
   - **Major Brands**: Patanjali, Dabur, Himalaya, Baidyanath, Organic India, Zandu, and newer wellness brands like Kapiva and Cureveda.
   - **International Presence**: Several brands are exporting Ayurvedic supplements to the global market, particularly targeting the wellness-conscious consumers in the US and Europe.
   - **Emerging Brands**: The space is also seeing an influx of startups focusing on Ayurvedic dietary supplements with modern packaging and online sales channels.
4. **Distribution Channels**
   - **Retail Stores**: Pharmacies, health food stores, and specialized Ayurvedic clinics.
   - **E-commerce**: Online sales through platforms like Amazon, Flipkart, and brand websites have seen significant growth.
   - **Direct-to-Consumer**: Some brands are focusing on selling directly through their websites, offering subscription models.
5. **Regulatory Environment**
   - **India:** The Ministry of AYUSH regulates Ayurvedic products in India. However, dietary supplements face scrutiny regarding their health claims, and there is increasing regulation to ensure product safety and efficacy.

- **Global Markets:** In countries like the US, the FDA regulates dietary supplements but does not require pre-market approval. Many Ayurvedic companies adhere to good manufacturing practices (GMP) to meet international standards.

6. **Challenges**
   - **Regulation and Standardization:** Ensuring consistent quality and standardization of herbal ingredients is a challenge. Authenticity, purity, and contamination issues are of concern to consumers.
   - **Awareness and Education**: While there is increasing awareness of Ayurveda, many consumers still lack knowledge about its benefits and the proper use of dietary supplements.
   - **Competition with Other Natural Health Products:** Ayurvedic supplements face competition from other natural health products, such as those based on Traditional Chinese Medicine, Western herbalism, or synthetic vitamins.
7. **Opportunities**
   - **Rising Global Demand:** The global wellness trend is pushing the demand for holistic and natural supplements, with Ayurvedic products gaining a strong foothold.
   - **Innovation:** Combining traditional Ayurvedic wisdom with modern science, as well as innovations in formulation (e.g., Ayurvedic superfoods, adaptogens, vegan and gluten-free products), can help expand the market.
   - **Education and Marketing:** Increased consumer education through marketing campaigns and partnerships with influencers or health professionals can boost credibility and demand.

Multiple Choice Questions

1. **What is the primary sweetening agent used in Avaleha Kalpana?**
   a. Ghee b. Sugar
   c. Honey d. All of the above
2. **Avaleha Kalpana is the upkalpana of which preparation method in Ayurveda?**
   a. Churna Kalpana b. Kvatha Kalpana
   c. Ghrita Kalpana d. Asava Kalpana
3. **Which of the following is NOT a synonym of Avaleha?**
   a. Leha b. Rasakriya
   c. Ghrita d. Lehya
4. **The word "Avaleha" is derived from which root word?**
   a. Rasa b. Liha
   c. Madhu d. Sveda
5. **What is the usual consistency of Avaleha preparation?**
   a. Solid b. Semi-solid
   c. Liquid d. Powder
6. **During the preparation of Avaleha, at what stage is honey usually added?**
   a. At the beginning b. In the middle
   c. After complete cooling
   d. During boiling
7. **Which ancient text describes 60 Avaleha yogas?**
   a. Sushruta Samhita
   b. Charaka Samhita
   c. Ashtanga Hridaya
   d. Sharngadhara Samhita
8. **Which of the following methods is used to check the readiness of Avaleha?**
   a. Tasting
   b. Pressing the preparation between fingers (Anguli Mudra)
   c. Weighing
   d. Measuring temperature
9. **Which ingredient is NOT typically part of Avaleha preparation?**
   a. Ghee b. Churna (Powder)
   c. Honey d. Vinegar
10. **The final consistency of Avaleha is confirmed by which test?**
    a. 1-2 thread consistency test
    b. Color test
    c. Smell test
    d. Taste test

11. What is the typical dosage of Avaleha according to classical texts?
a. 12 grams b. 48 grams
c. 24 grams d. 60 grams

12. Which part of the plant is generally used in Vasa Avaleha?
a. Root b. Fruit
c. Leaf d. Flower

13. What type of flame is preferred while boiling the Avaleha mixture?
a. High flame b. Mild flame
c. Low flame d. No flame

14. Which of the following is a method for preserving Avaleha properly?
a. Storing in a cool, dry place
b. Storing in a heated area
c. Keeping it exposed to air
d. Adding vinegar for preservation

15. What is the shelf life of Avaleha according to the Government of India Gazette 2016?
a. 1 year b. 2 years
c. 3 years d. 5 years

16. Which ingredient should NOT be heated when preparing Avaleha?
a. Ghee b. Jaggery
c. Honey d. Sugar

17. Which Avaleha preparation is used in the treatment of respiratory conditions like asthma?
a. Agashtyaharitaki Avaleha
b. Vasavaleha
c. Kushmanda Avaleha
d. Dashamula Avaleha

18. In which ancient text is the concept of Haviprasha Kalpana, an earlier form of Avaleha, mentioned?
a. Vedic Period texts b. Charaka Samhita
c. Sushruta Samhita d. Ashtanga Hridaya

19. Which of the following ingredients is commonly used as the Madhura Dravya in Avaleha preparation?
a. Pippali b. Sita (Sugar)
c. Neem d. Amla

20. Which preparation method involves the boiling of Kvatha to a semi-solid state with the addition of sweet substances?
a. Churna Kalpana b. Avaleha Kalpana
c. Taila Kalpana d. Asava Kalpana

21. What does "Sneha" refer to in Ayurveda?
a. Medicinal herbs
b. Fats or oily materials
c. Water d. Decoctions

22. Which of the following is NOT a type of Sneha?
a. Ghrita b. Taila
c. Majja d. Churna

23. Why is Ghrita considered the best Sneha Dravya?
a. It is less expensive than oils.
b. It loses its properties when mixed with herbs.
c. It preserves its inherent qualities while infusing medicinal properties.
d. It has a longer shelf life than all oils.

24. What is the primary aim of Sneha Kalpana?
a. To enhance flavor
b. To extract lipid-soluble active principles from drugs
c. To reduce preparation time
d. To increase bitterness

25. What is the ratio of Drava Dravya to Sneha Dravya in the general method of preparation?
a. 1:4 b. 4:1
c. 16:1 d. 4:16

26. Which of the following is a sign of successful preparation (Sneha-Siddhi Lakshanas)?
a. Strong aroma
b. Complete absorption of the liquid
c. Formation of large bubbles
d. Excess moisture present

27. What is the significance of temperature control in Sneha Kalpana?
a. To reduce costs
b. To achieve uniform color
c. To preserve medicinal properties and achieve proper consistency
d. To speed up the preparation process

28. What does the term "Sneha Murchchhana" refer to?
a. A method of packaging
b. A purification process for oils
c. A type of herbal paste
d. A storage technique

29. According to Ayurveda, how much Drava Dravya is added when using Jala as the liquid component?
a. 1/4th b. 1/6th
c. 1/8th d. 1/2

30. What is the objective of the Sneha Murchchhana process?
a. To increase viscosity
b. To eliminate bad odor and remove toxicity
c. To change color
d. To enhance bitterness

31. What is the primary purpose of Ghrita Murchchhana in Ayurvedic practice?
a. To purify metals
b. To enhance the potency of herbal medicines
c. To treat skin diseases
d. To prepare herbal pastes

32. In the preparation of Ghrita Murchchhana, which ingredient is used in the largest quantity?
a. Haritaki b. Ghrita
c. Amalaki d. Matulunga Rasa

33. Which of the following is NOT an ingredient in the Ghrita Murchchhana recipe?
a. Haridra b. Bilva
c. Amalaki d. Musta

34. During the preparation of Taila Murchchhana, what is the ratio of Kalka Dravya to Tila Taila?
a. 1:1 b. 1:4
c. 1:2 d. 1:8

35. What does 'Sneha Siddhi Lakshana' refer to in the context of the preparation?
a. The final texture and aroma of the oil/ghee
b. The amount of herbal paste used
c. The temperature at which the mixture is heated
d. The duration of the preparation

36. In the context of Ghrita Murchchhana, what does the term 'Vartivat' mean?
a. Absence of sound
b. Like a ball or wick
c. Color change
d. Aroma development

37. Which ingredient is used as the Drava Dravya in the preparation of Sarshapa Taila Murchchhana?
a. Jala b. Matulunga Rasa
c. Dadhi + Kanjika d. Tila Taila

38. What is the significance of the term 'Phenodgamah' during the preparation of Sneha?
a. It indicates the preparation is not complete
b. It indicates the appearance of foam
c. It signifies a change in color
d. It describes the consistency of the herbal paste

39. What is the main indication of the 'Shabda-Hinah' characteristic during the Sneha preparation?
a. The presence of a strong aroma
b. The absence of any hissing or crackling sound
c. The color change of the mixture
d. The consistency of the herbal paste

40. In the preparation of Eranda Taila Murchchhana, which ingredient is included as a part of the Kalka Dravya?
a. Musta b. Nalika
c. Haridra d. All of the above

41. What is the classification of Sneha Paka according to Sharngadhara Samhita?
a. Manda Paka, Chikkana Paka, Khara Paka
b. Mridu Paka, Madhyama Paka, Khara Paka
c. Mridu Paka, Madhyama Paka, Dagdha Paka
d. Mridu Paka, Amapaka, Khara Paka

42. Which type of Sneha Paka is characterized by a soft kalka that is slightly moist?
a. Madhyama Paka b. Khara Paka
c. Mridu Paka d. Dagdha Paka

43. What does Khara Paka signify in terms of kalka consistency?
a. Moist and soft
b. Rough and completely devoid of moisture
c. Soft and free of moisture
d. Heavy and lacking potency

44. According to Vagabhata, which type of Sneha Paka is mentioned?
a. Mridu Paka b. Dagdha Paka
c. Manda Paka d. Amapaka

45. What is the recommended use for Madhyama Paka?
a. Only for Nasya
b. For Abhyanga only
c. For various procedures like Pana, Abhyanga, Basti, etc.
d. Not recommended for therapeutic purposes

46. What is the main characteristic of Amapaka?
a. It is overcooked.
b. It is heavy and lacks potency.
c. It is soft and moist.
d. It is perfectly shaped.

47. In Gandha Paka, what is the ratio of Gandha dravya kalka to total oil quantity according to wise physicians?
a. 1/4th b. 1/8th
c. 1/3rd d. 1/2nd

48. How long should ghrita, taila, and similar preparations be cooked according to Sharngadhara Samhita?
a. In a single day
b. Over multiple days
c. For one week continuously
d. Only overnight

49. What is the shelf life of Ghrita according to the Gazette of the Government of India 2016?
a. 1 Year b. 16 Months
c. 2 Years d. 3 Years

50. Which type of Paka is considered therapeutically unfit due to being overcooked?
a. Mridu Paka b. Madhyama Paka
c. Khara Paka d. Dagdha Paka

51. What is the literal meaning of the term "Sandhana" as per Shabdakalpadruma?
a. Preservation b. Fermentation
c. Combination d. Sweetening

52. Which of the following is a primary outcome of the Sandhana Kalpana process?
a. Decoctions b. Powders
c. Asava and Arishta d. Oils

53. What is the role of ethanol in Sandhana Kalpana?
a. It adds color to the formulation
b. It enhances the medicinal properties
c. It makes the preparation solid
d. It neutralizes the herbs

54. Which of the following is NOT a benefit of Sandhana Kalpana formulations?
a. Long shelf life
b. Faster absorption
c. Slow enzymatic activity
d. Higher bioavailability

55. What is the primary sweetening agent used in Sandhana Kalpana?
a. Jaggery b. Salt
c. Oil d. Lemon

56. The active fermentation process in Sandhana Kalpana involves which of the following?
a. Acid bacilli and glucose
b. Yeast cells and sugar
c. Lactobacilli and ethanol
d. Alcohol and sulfur

57. What is the ideal room temperature range for Sandhana Kalpana fermentation?
a. 15°C to 20°C b. 25°C to 30°C
c. 35°C to 40°C d. 5°C to 10°C

58. What type of vessel is commonly used for fermenting Dashmoola Arishta?
a. Stainless steel vessel b. Glass jar
c. Mud pot d. Wooden barrel

59. Which of the following tests indicates the presence of CO_2 during fermentation?
a. Water test b. Candle test
c. Floatation test d. Odor test

60. What type of product is primarily produced in Madhya Kalpana?
a. Alcoholic b. Acidic
c. Aqueous d. Salty

61. In the Candle Test, what does it mean if the candle continues to burn during the fermentation process?
a. Fermentation is ongoing
b. Fermentation is complete
c. Fermentation has failed
d. The vessel is contaminated

62. Which Praksepa dravya is used in the preparation of Drakshasava?
a. Salt b. Honey
c. Sugar d. Ghee

63. According to classical texts, what is the maximum fermentation time mentioned in Ashtanga Sangraha?
a. 30 days b. 120 days
c. 180 days d. 60 days

64. Which of the following refers to the sweetening agents in Sandhana Kalpana?
a. Prakshepa Dravya b. Madhura Dravya
c. Drava Dravya d. Sandhana Dravya

65. What is the difference between Asava and Arishta?
a. Asava uses kvatha, Arishta does not
b. Asava has a lower alcohol content than Arishta
c. Asava uses liquid ingredients; Arishta uses decoctions
d. Asava is used for Vata disorders; Arishta for Pitta disorders

66. Which season is considered ideal for Sandhana Kalpana according to Ayurvedic texts?
a. Summer b. Monsoon
c. Spring d. Winter

67. What is the alcohol content range typically found in Sandhana Kalpana products?
a. 1-2% b. 3-5%
c. 5-10% d. 10-15%

68. Which test is used to monitor carbon dioxide levels during fermentation?
a. Litmus paper test b. Lime water test
c. Iodine test d. Flame test

69. Which of the following formulations has the highest alcohol content?
a. Arjunarishta b. Kumaryasava
c. Abhayarishta d. Lohasava

70. What is the typical therapeutic dosage for Asava/Arishta according to Ayurveda?
a. 1 Karsha (12 g) b. 1 Pala (48 g)
c. 1 Tola (12 g) d. 1 Prastha (768 g)

71. What does "Pathya" primarily refer to in Ayurveda?
a. Medicine
b. Suitable diet and lifestyle
c. Herbal formulation
d. Detoxification process

72. Which of the following is considered the supreme medicine in Ayurveda according to Acharya Kashyapa?
a. Rasayana b. Ahara (Diet)
c. Panchakarma d. Yoga

73. In Pathya Kalpana, which dosha is balanced by consuming sweet, cooling foods?
a. Vata b. Pitta
c. Kapha d. All three doshas

74. Which of the following foods is generally considered "Pathya" for Pitta pacification?
a. Spicy foods
b. Sweet and cooling foods
c. Fried foods d. Sour foods

75. What is the meaning of "Apathya" in Ayurvedic Pathya Kalpana?
a. Suitable diet
b. Unsuitable diet or lifestyle
c. Ayurvedic herbs
d. Detoxification

76. Which type of food is generally considered "Apathya" for Kapha dosha?
a. Spicy and warm foods
b. Sweet and oily foods
c. Dry and light foods
d. Bitter foods

77. Pathya Kalpana is essential for the success of which Ayurvedic treatment?
a. Shodhana (Purification)
b. Rasayana (Rejuvenation)
c. Both Shodhana and Rasayana
d. None of the above

78. Which of the following is considered Pathya in Vata-related disorders?
a. Dry and cold foods
b. Warm, oily, and moist foods
c. Bitter and astringent foods
d. Raw foods

79. In Ayurveda, what is the role of "Ritu Haritaki"?
a. Seasonal detoxification
b. Daily detox routine
c. Panchakarma therapy
d. Yoga practice

80. Which taste is typically advised to avoid for Kapha dosha management in Pathya Kalpana?
a. Bitter b. Sour
c. Sweet d. Astringent

81. Pathya Kalpana emphasizes the importance of consuming food that is:
a. Raw and uncooked
b. Processed and preserved
c. Fresh, seasonal, and locally sourced
d. Fast and convenient

82. Which of the following grains is considered Pathya for managing Vata dosha?
a. Barley b. Millet
c. Rice d. Corn

83. In Pathya Kalpana, which of the following oils is most suitable for Vata imbalance?
a. Sesame oil b. Coconut oil
c. Mustard oil d. Olive oil

84. What type of food preparation is recommended for people with Pitta imbalances?
a. Grilled and spicy food
b. Raw and cold food

c. Cooling and non-spicy food
d. Dry and bitter food

85. Which of the following vegetables is "Pathya" for Pitta dosha?
a. Spinach
b. Bell peppers
c. Cucumber
d. Onions

86. Which taste should be predominant in the diet of someone with Vata dosha imbalance according to Pathya Kalpana?
a. Sweet, sour, and salty
b. Pungent and bitter
c. Sour and astringent
d. Bitter and sweet

87. Pathya for someone recovering from fever (Jwara) generally includes:
a. Hot and spicy foods
b. Light and easily digestible foods
c. Raw fruits and vegetables
d. Heavy, rich foods

88. Which Ayurvedic practice involves a diet and lifestyle regimen tailored to an individual's constitution and current condition?
a. Rasayana Kalpana
b. Pathya Kalpana
c. Panchakarma
d. Shirodhara

89. For balancing Kapha dosha, which of the following is recommended in Pathya Kalpana?
a. Warm, light, and dry foods
b. Sweet, oily, and heavy foods
c. Cold and moist foods
d. Sour and salty foods

90. Which of the following fruits is considered Pathya for Pitta dosha?
a. Mango
b. Grapes
c. Banana
d. Pineapple

Answer Sheet

1.	B.	2.	B.	3.	C.	4.	B.	5.	B.	6.	C.	7.	B.	8.	B.
9.	D.	10.	A.	11.	B.	12.	C.	13.	B.	14.	A.	15.	C.	16.	C.
17.	B.	18.	A.	19.	B.	20.	B.	21.	B.	22.	D.	23.	C.	24.	B.
25.	A.	26.	B.	27.	C.	28.	B.	29.	A.	30.	B.	31.	B.	32.	B.
33.	B.	34.	B.	35.	A.	36.	B.	37.	A.	38.	B.	39.	B.	40.	D.
41.	B.	42.	C.	43.	B.	44.	C.	45.	C.	46.	B.	47.	B.	48.	B.
49.	C.	50.	D.	51.	B.	52.	C.	53.	B.	54.	C.	55.	A.	56.	B.
57.	B.	58.	C.	59.	B.	60.	A.	61.	B.	62.	B.	63.	C.	64.	B.
65.	C.	66.	C.	67.	C.	68.	B.	69.	B.	70.	B.	71	B.	72.	B.
73.	B.	74.	B.	75.	B.	76.	B.	77.	C.	78.	B.	79.	A.	80.	C.
81.	C.	82.	C.	83.	A.	84.	C.	85.	C.	86.	A.	87.	B.	88.	B.
89.	A.	90.	B.												

Write Short Question

1. What are the essential ingredients required in the preparation of Avaleha, and how do they contribute to its therapeutic effects?
2. Describe the Siddhi Lakshana (signs of perfection) that indicate a well-prepared Avaleha.
3. How does temperature play a critical role during the preparation of Avaleha, and what are the consequences of improper temperature control?
4. What is the general shelf life of Avaleha preparations, and how does it differ in examples like Vasavaleha and Kushmanda Avaleha?
5. What is the primary aim of Sneha Kalpana in Ayurvedic medicine?
6. List the essential ingredients used in the preparation of Sneha (medicated oils or ghee).
7. What is the significance of Ghrita Murchchhana and Taila Murchchhana in Sneha Kalpana?
8. Explain the concept of Avartana in the preparation of Sneha Kalpana.
9. What is Sandhana Kalpana, and what is its significance in Ayurvedic medicine? Provide an overview of its classification.
10. Describe the general method of preparation of Sandhana Kalpana, including the essential ingredients and the process involved in Sandhana Vidhi.
11. What are the key differences between Asava and Arishta in terms of preparation and composition? Include the factors that influence the alcohol percentage in these formulations.
12. Explain the role of the Burning Candle Test and Lime Water Test in the evaluation of Sandhana Kalpana. What observations can be made from these tests?
13. What is Pathya Kalpana, and what are its main types and significance in Ayurvedic dietary practices?
14. Describe the general method of preparation for at least three types of Pathya Kalpana, such as Manda, Peya, and Yavagu.

Write Long Question

1. Discuss the definition, essential ingredients, and general method of preparation of Avaleha Kalpana. How is temperature control important in ensuring the quality of Avaleha? Illustrate your answer with examples such as Vasavaleha and Kushmanda Avaleha.
2. Discuss in detail the general method of preparation of Sneha Kalpana, highlighting the importance of temperature, the types of Snehapaka (cooking stages), and the specific rules to be followed during the preparation of medicated oils and ghee. Include examples like Kshirabala Taila and explain the time duration required for its preparation.
3. Explain the concepts of Gritha Murchchhan and Taila Murchchhana in Sneha Kalpana. Discuss their significance in purifying and enhancing the medicinal properties of ghee and oil, respectively. Additionally, elaborate on the concept of Avartana and its importance in repeated processing of Sneha Kalpana for increasing potency.
4. Explain the significance and classification of Sandhana Kalpana, highlighting the differences between Madhya and Shuktha Kalpana. Describe the preparation method, essential ingredients, and key tests such as the Burning Candle Test and Lime Water Test.
5. Analyze factors influencing Asava and Arishta preparations, including Sandhana Patra selection, fermentation conditions, and temperature. Discuss Sandhana Kala, the role of honey and Bhasma, and compare the shelf life and alcohol content of Draksharishta and Ushirasava, along with recent research findings.
6. Explain Pathya Kalpana in Ayurveda, covering its definition, significance, and types like Manda, Peya, and Yavagu. Discuss the general preparation methods for each type, their therapeutic benefits, and recent research updates, including insights from market surveys on related dietary supplements.

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8 Rasa Dravya Parichaya - I

• Lecture: 12 hours, non-lecture: 4 • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- Yes) •

Parada (Mercury)

Introduction

- Parada, commonly known as mercury, is a silver-colored liquid metal scientifically termed Hydrargyrum or Quick Silver.
- Mercury does not oxidize at ordinary temperatures but tarnishes in the presence of hydrogen sulfide in the air.
- It is resistant to both diluted and concentrated hydrochloric acid (HCl).
- When exposed to concentrated sulfuric acid, mercury reacts to form mercuric sulfate with the release of sulfur dioxide.
- It dissolves in cold diluted nitric acid to produce mercurous nitrate and in hot concentrated nitric acid to form mercuric nitrate.
- In Indian mythology, Parada is regarded as the semen (veerya) of Lord Shiva, which descended to earth during a divine union between Lord Shiva and Goddess Parvati.
- This belief elevates Parada's status as a sacred and powerful substance.
- Parada is revered in alchemical traditions for its divine properties, believed to have the power to eradicate diseases, reverse aging, and even conquer death.

Synonyms

1. According to Gati
- Khechara
- Chala
- Chapala

2. According to Devatamaka
- Trinetra
- Shiva Bija
- Prabhu
- Rudraja
- Trilochana

3. According to Rupaatmaka
- Jaiva
- Divya
- Jiva
- Achintaya

4. According to Dehatmaka
- Amrita
- Parada
- Paramamrita
- Mrityunashana

5. According to Dhatuvada
- Rasa
- Rasanatha
- Rasendra
- Rasaleha
- Suta
- Divyarasa

6. According to Svarupatmaka
- Galada Roupyanibha
- Svarna
- Mahateja

Mineralogical Identification

Properties	Identification
Chemical Name	Mercury
Chemical Composition	Hg
Colour	Tin White
Cleavage	None
Luster	Metallic
Streak	None
Specific Gravity	13.55
Melting Point	-38.8 degree C
Boiling Point	357 degree C
Transparency	Opaque

Properties	Identification
Atomic Number	80
Atomic Weight	200.61

Sources

- Mercury predominantly occurs in deposits worldwide, most commonly in the form of cinnabar (mercuric sulfide or HgS).
- Native mercury, a pure metallic form, is exceptionally rare and constitutes only about 0.08 ppm (parts per million) of the Earth's crust by mass.
- Despite its low crustal abundance, mercury does not readily combine with major crustal elements, leading to highly concentrated ore deposits.
- Rich mercury ores can contain up to 2.5% mercury by mass, while even lower-grade ores have a concentration of at least 0.1%, which is 12,000 times the average abundance.
- Mercury is found in its native metallic state (rare) or as part of minerals such as cinnabar, corderoite, and livingstonite.
- Among these, cinnabar (HgS) is the most significant and commonly mined ore.
- Mercury deposits are typically located in young orogenic belts, where dense rocks are pushed toward the Earth's surface.
- Such deposits are often associated with hot springs and volcanic regions.
- Major Mercury mining regions include South Africa, South America, Australia, Europe, China, North America, Italy, Spain, Hungary, Germany, and New Zealand.

Types

रसो रसेन्द्रः सूतश्च पारदो मिश्रकस्तथा।
इति पञ्चविधो जातः क्षेत्रभेदेन शम्भुजः॥ (R.R.S. 1/67)

Depending on the different places of availability, 'pärada' is of five types:

1. Rasa
2. Rasendra
3. Suta
4. Parada
5. Misharaka

1. Rasa

रसनात् सर्वधातूनां रस इत्यभिधीयते।
जरारुङ्मृत्युनाशाय रस्यते वा रसो मतः॥ (R.R.S. 1/76)

- Rasa (mercury) assimilates substances like abhrakadi rasa dravya and svarnadi dhatu.
- It slows aging (jara), heals diseases (ruja), and delays death (mrityu).
- Its transformative and therapeutic properties make it vital in traditional medicine.

2. Rasendra

रसोपरसराजत्वाद्रसेन्द्र इति कीर्तितः। (R.R.S. 1/77)

- Mercury holds the highest status as the supreme dravya among all rasoparasa and dhatu.
- Due to its unparalleled significance, it is uniquely identified by the term 'Rasendra'.

3. Suta

देहलोहमयीं सिद्धिं सूते सूतस्ततः स्मृतः॥ (R.R.S. 1/77)

- Known as 'Suta', mercury is renowned for its ability to restore health effectively.
- It plays a pivotal role in pharmaceutical processes involving svarna (gold) and other dhatu dravyas.

4. Parada

रोगपङ्काब्धिमग्नानां पारदानाच्च पारदः। (R.R.S. 1/78)

- Referred to as Parada, mercury is celebrated for its life-saving properties.
- It protects humanity by pulling them out of the depths of various diseases.

5. Mishraka

सर्वधातुगतं तेजोमिश्रितं यत्र तिष्ठति।
तस्मात् स मिश्रकः प्रोक्तो नानारूपफलप्रदः॥ (R.R.S. 1/78)

- Mercury, termed as 'Mishraka', has the unique ability to readily digest all dhatu dravyas (metals and minerals).
- This property makes it a vital substance, offering numerous therapeutic benefits.

Grahya and Agrahyata

Grahya Lakshana

अन्तः सुनीलो बहिरुज्ज्वलो यो मध्याह्नसूर्यप्रतिमः प्रकाशः।
(Rasamanjari 1/15)

Agrahya Lakshana

.....धूम्रः परिपाण्डुरश्च चित्रो न योज्यो रसकर्मसिद्ध्यै॥
(Rasamanjari 1/15)

Mercury which is soft to touch and deep black inside with luster outside like a midday sun (for Rasakarma) smoky but not glittering white or any color ray should be used for preparation of such herbo mineral preparations as advised.

Hingulottha Parada

दरद: पातनायन्त्रे पातितश्च जलाश्रये।
तत्सत्त्वं सूतसंकाशं जायते नात्र संशय:।। (R.R.S. 3/154)

1. Powder ashuddha hingula (cinnabar) in a clean khalva yantra.
2. Triturate with nimbu svarasa or any amla dravya svarasa for 8 hours.
3. Apply the hingula paste to the base of the upper pot of the adhah patana yantra.
4. Heap dry cow dung cakes over the yantra and heat moderately for 9 hours (3 praharas).
5. Mercury trickles down into the water in the lower pot.
6. Cool the yantra overnight, separate the pots, and collect the mercury.
7. The mercury is pure, free of saptakancuka dosas, and requires no further purification.

Doshas

Parada Dosha Classified into 3 types

1. Naisargika

- Mercury is a naturally occurring metal that must be mined from the earth.
- As a liquid metal, mercury naturally digests other metals and minerals it comes into contact with.
- Mercury often exists mixed with other metals, even in its native or free state.
- It is never 100% pure due to its interaction with surrounding substances.
- Metals like copper, lead, tin, and zinc are commonly found in trace amounts in natural mercury.
- These trace elements are classified as 'natural impurities' or 'naisargika doshas' of mercury.

विषं वह्निर्मलश्चेति दोषा नैसर्गिकास्त्रय:। (R.R.S. 11/20)

- Visha
- Vahni
- Mala

2. Yougika

- Mercury used in trade and commerce is often *adulterated with cheaper metals for increased profit margins.*
- Metals like naga (lead) and vanga (tin) are frequently added to mercury during its commercial processing.
- As a result, the mercury available in the market is usually mixed with such impurities.
- These commercially introduced impurities are categorized as 'yaugika dosha' (compound impurities).

यौगिकी नागवङ्गौ द्वौ। (R.R.S. 11/18)

- Naga
- Vanga

3. Aupadhika/ Saptakanchuka

पर्पटी पाटिनी भेदी द्रावी मलकरी तथा।
अन्धकारी तथा ध्वाङ्क्षी विज्ञेया: सप्तकञ्चुका:।। (R.R.S. 11/24)

- Mercury inherently contains natural digested impurities known as naisargika dosha.
- Prolonged exposure to atmospheric conditions leads to the oxidation of these surface impurities.
- Oxidized impurities form a thin sheath of dirt on mercury's surface, dulling its natural lustre.
- These oxidized surface impurities are referred to as aupadhika dosha or saptakancuka dosha:
  - Parpati
  - Patini
  - Bedhi
  - Dravi
  - Malakari
  - Andhkari
  - Dravankshi

Shodhana

Samanya Shodhana

Method 01

रसेश्वरं समसुधारजसा मर्दयेत् त्र्यहम्।
ततो द्विगुणवस्त्रान्तर्गालितं खल्वके न्यसेत्।।
रसोनं निस्तुषं तुल्यं तदर्धं लवणं हरेत्।
तत्कल्के मर्दयेत्सूतं यावदायाति कृष्णताम्।।
कृष्णं कल्कं परित्यज्य तथा प्रक्षाल्य युक्तित:।
एवमेकेन वारेण रसेन्द्र: शुद्धिमाप्नुयात्।। (R.T. 5/27-29)

1. Place the mercury parade in a large stone khalva yantra.
2. Add an equal amount of sudha raja (fine limestone powder).
3. Continuously grind the mixture for 3 days, ensuring a minimum of 8 hours per day.
4. By the end of this trituration, the mercury will partially disperse into the limestone in globular form.

5. Carefully collect the visible mercury from the mixture.
6. Wash the collected mercury with warm water and set it aside for further processing.
7. Transfer the limestone mixture into a large plastic bucket filled with warm water.
8. Stir gently to settle the mercury at the bottom.
9. Carefully decant the upper water layer containing suspended limestone.
10. Repeat this process multiple times, adding fresh warm water each time, until clear mercury is seen at the bottom.
11. Collect all the recovered mercury for the next phase.
12. Place the collected mercury in the khalva yantra.
13. Add an equal quantity of de-husked lashuna (garlic) and half the quantity of saindhava lavana (rock salt).
14. Continuously grind the mixture until it turns completely black. This process may take 2 to 3 days.
15. Carefully wash the black mixture with warm water using the same decantation method as in
16. Collect the purified mercury (parada) for subsequent processing or usage.

Method 02

एकेन लशुनेनापि शुद्धो भवति पारद:।
पिष्टो लवणसंयुक्तो सप्ताहं तप्तखल्वके।। (Ay.Pra. 1/165)

1. Place the required quantity of ashuddha parada into a clean, heated tapta khalva yantra.
2. Add an equal quantity of lashuna kalka (garlic paste).
3. Add an equal quantity of saindhava lavana (rock salt).
4. Triturate the mixture continuously for 7 days, ensuring consistent and thorough grinding each day.
5. Maintain the process to allow the ingredients to react effectively with the mercury.
6. On the 8th day, carefully collect the mercury from the mixture.
7. Wash the collected mercury multiple times using warm water.
8. Ensure all residual garlic paste and salt are completely removed.
9. Store the purified mercury (shuddha parada) separately in a clean container.
10. It is now ready for further pharmaceutical applications.

Vishesha Shodhana

A. Parada Naga dosha Shodhana

धूमेष्टिकाहट्टविलासिनीनां सोर्णीस्तु चूर्णै: परिमर्द्य सूतम्।
प्रक्षालयेदम्लजलेन सम्यक् ततो रसो मुञ्चति नागदोषम्।। (R.T. 5/22)

1. Place mercury in a clean khalva yantra.
2. Add Suta, brick powder, turmeric, and sheep wool (each 1/16th part of mercury).
3. Add aloe vera juice and triturate for 8 hours.
4. Wash the mixture thoroughly with kanji until the mercury is free from impurities.
5. Collect the purified mercury and store it for further use.

B. Parada Vanga dosha Shodhana

मृगेक्षणाङ्कोलनिशोत्थचूर्णै: सूतो जहातीह तु वङ्गदोषम्। (R.T. 5/23)

1. Place mercury in a clean khalva yantra.
2. Add indrayana churna, ankola churna, and haridra churna (each 1/16th part of the mercury's weight).
3. Add enough ghritakumari svarasa (aloe vera juice) to form a paste.
4. Triturate the mixture continuously for 8 hours.
5. Wash the triturated mixture thoroughly with kanji until the mercury is completely free of impurities.
6. Collect the purified mercury and store it in a clean, dry container.
7. This process effectively removes vanga dosa from mercury, ensuring it is purified for pharmaceutical use.

C. Parada Agni and Mala dosha Shodhana

चित्रोऽग्निदोषं विनिहन्ति शीघ्रं दोषं मलोत्थं खलु राजवृक्ष:। (R.T. 5/23)

1. Agni Dosha Removal

- Place mercury in a clean khalva yantra.
- Add chitraka mula churna (1/16th part of mercury's weight).
- Add sufficient ghritakumari svarasa.

- Triturate continuously for 8 hours.
- Wash the mixture thoroughly with kanji until the mercury is free from Agni dosha.

2. Mala Dosha Removal

- Place mercury in a clean khalva yantra.
- Add Aragvadha tvak Churna (1/16th part of mercury's weight).
- Add sufficient ghritakumari svarasa.
- Triturate continuously for 8 hours.
- Wash the mixture thoroughly with kanji until the mercury is free from mala dosha.
- Final Collection:
- Collect the purified mercury and store it in a clean, dry container for pharmaceutical use.

D. Parada Chapalya and Visha dosha Shodhana

चापल्यहारी खलु कृष्णधूर्तो विषापहर्त्री त्रिफला प्रशस्ता।
(R.T. 5/24)

1. Chapalya Dosha

- Place the required quantity of mercury in a clean khalva yantra.
- Add Krishna dhattura panchanga or Bija churna (1/16th part of mercury's weight).
- Add sufficient ghritakumari svarasa.
- Triturate thoroughly for 8 hours.
- Wash the mixture carefully with kanji until the mercury is free from chapalya dosha.

2. Visha Dosha

- Place the required quantity of mercury in a clean khalva yantra.
- Add triphala churna (1/16th part of mercury's weight).
- Add sufficient ghri takumari svarasa.
- Triturate thoroughly for 8 hours.
- Wash the mixture carefully with kanji until the mercury is free from visha dosha.
- Collect the purified mercury and store it in a clean, dry container for further pharmaceutical use.
- This process ensures complete purification of mercury, removing chapalya dosha and visha dosha effectively.

E. Parada Giri and Vahni Dosha Shodhana

दोषं गिरेस्व्यूषणमाशु हन्यात् त्रिकण्टको वह्न्यसहत्वदोषम्।
(R.T. 5/24)

1. Giri Dosha

- Place the required quantity of mercury in a clean khalva yantra.
- Add trikatu churna (1/16th part of mercury's weight).
- Add sufficient ghritakumari svarasa.
- Triturate thoroughly for 8 hours.
- Wash the mixture carefully with kanji until the mercury is free from giri dosha.

2. Vahni Dosha

- Place the required quantity of mercury in a clean khalva yantra.
- Add Gokshura churna (1/16th part of mercury's weight).
- Add sufficient Ghritakumari svarasa.
- Triturate thoroughly for 8 hours.
- Wash the mixture carefully with kanji until the mercury is free from vahni dosha.
- Collect the purified mercury and store it in a clean, dry container for further pharmaceutical use.

Marana

Method 01: Rasendra Sara Sangraha

1. Take 1 part of Shuddha Parada (purified mercury).
2. Add half part of Shuddha Gandhaka (purified sulfur).
3. Triturate the Parada and Gandhaka thoroughly until a fine black powder, known as kajjali, is formed.
4. Add kumara rasa (aloe vera juice) to the kajjali and continue triturating.
5. Shape the mixture into small circular pellets (chakrikas).
6. Place the chakrikas in a sharava samputa (a sealed earthen dish).
7. Subject the sharava samputa to heat using the Bhudhara Yantra method for one day.
8. After cooling, carefully collect the rasa bhasma (ash of mercury).
9. Store the prepared rasa bhasma in a clean, dry container for further use.

Lakshana of Mrita Parada

आर्द्रत्वं घनत्वञ्च तेजो गौरवचापलम्।
यस्यैतानि न दृश्यन्ते तं विद्यान्मृतसूतकम्। (Rasa. 11/200)

- **Ardratvam (Moisture)**: Mercury in its natural state is liquid and exhibits moisture. Incinerated mercury loses this property.
- **Ghanatvam (Density)**: Raw mercury is dense and flows easily, but after proper incineration, it becomes light and powdery.
- **Tejah (Luster)**: Mercury's inherent luster diminishes after it is properly processed.
- **Gaurava (Heaviness)**: Mercury is known for its heaviness, but upon incineration, it becomes light.
- **Chapalam (Volatility)**: Mercury in its raw form is volatile and mobile, but in its incinerated state, this characteristic disappears.

Parada Gati

Parada gati refers to the loss of mercury during processing, derived from gati, meaning movement or departure.

Causes

- Inexperience or lack of skill.
- Faulty or improperly sealed instruments.
- Excessive heat during processes like agni-samskarana.
- Hasty execution of procedures.

Prevention: Proper care, equipment, and expertise can reduce but not completely prevent mercury loss.

Inevitable Loss

- Small losses occur in procedures like svedana (steaming), mardana (trituration), prakshalana (washing), and patana (distillation).
- Only 1/8th of mercury remains after Ashta-samskara (eight procedures).
- Effective precautions can mitigate loss but cannot entirely eliminate it.

Parada gati- types

जलगो जलरूपेण त्वरितो हंसगो भवेत्।
मलगो मलरूपेण सधूमो धूमगो भवेत्।।
अन्या जीवगतिर्दैवी जीवोऽण्डादिव निष्क्रमेत्।
स तांश्च जीवयेज्जीवांस्तेन जीवो रसः स्मृतः।।
(R.R.S. 1/82-83)

1. Jala Gati

जलगो जलरूपेण

- During jala-samskara (water-based procedures) or washing, minute droplets of mercury separate.
- These droplets often float on the water's surface and eventually disappear.

2. Hamsa Gati

त्वरितो हंसगो भवेत्।

- Mercury droplets are often lost during mardana (trituration) or when transferring mercury between vessels.
- The droplets may leap or scatter, resembling the movement of white swans (hamsa), particularly during rushed procedures.

3. Mala Gati

मलगो मलरूपेण।

- Mercury loss occurs during samanya (general) and vishesha shodhana (specific purification).
- Impurities such as naisargika dosha (natural impurities), yaugika dosha (compound-related impurities), and saptakanchuka dosha (seven-covering impurities) are removed, resulting in a reduction of mercury quantity.

4. Dhuma Gati

सधूमो धूमगो भवेत्।

- Mercury is lost in the form of fumes during agni-samskarana (heat-based processing).
- Particularly during gandhaka jarana (sulfur assimilation), mercury fumes escape along with sulfur fumes, leading to dhuma gati (loss as smoke).

5. Jiva Gati

अन्या जीवगतिर्दैवी जीवोऽण्डादिव निष्क्रमेत्। (R.R.S. 1/83)

- Mercury loss can be as subtle and imperceptible as the departure of jiva (life) or prana (vital breath) from the body after death.
- Parada gati encompasses both visible losses (e.g., droplets or fumes) and invisible losses that are difficult to detect.

Point to be Noted

चतस्रो गतयो दृश्या अदृश्या पञ्चमी गतिः।
मन्त्रध्यानादिना तस्य रुध्यते पञ्चमी गतिः।।
इति भिन्नगतित्वाच्च सूतराजस्य दुर्लभः।
संस्कारस्तस्य भिषजा निपुणेन तु रक्षयेत्।। (R.R.S. 1/84-85)

a. Visible Mercury Loss

- The first four types of mercury loss—jala gati (water loss), mala gati (impurity loss), hamsa gati (leaping droplets), and dhuma gati (fumes)—are visible to the naked eye.
- These losses can be minimized with practical experience and proper measures, though complete prevention is not achievable.

b. Invisible Mercury Loss: The fifth type, jiva gati (life-like loss), is invisible and difficult to comprehend.

c. Prevention of Jiva Gati: Ancient texts suggest that jiva gati can be prevented through mantra (chanting) and dhyana (meditation).

Parada Ashtasamskara

Already Discussion in Chapter- 02

Parada Bandha

Already Discussion in Chapter- 02

Properties

- **Rasa**: Shadrasa
- **Guna**: Snigdha, Sara, Guru
- **Dosha**: Tridoshahara
- **Karma**: Yogavahi, Balaya, Vrishya, Pushtikara, Rasayana, Vajikarana.
- **Therapeutic Indications**: Krimi, Kushtha, Sarvaroga, Vali- Palita, Tridoshaja Roga.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Visible impurities are mechanically removed via trituration and decantation.
- Mercury changes from shiny liquid to globules with limestone and black during garlic-salt trituration.
- Trituration creates finer globules, enhancing reactivity.
- Grinding ensures uniform mixing for even purification.

b. Chemical Changes

- Mercury forms temporary amalgams with limestone and salt to extract impurities.
- Garlic's sulfur compounds induce reactions that detoxify metallic impurities.
- Garlic binds mercury to form detoxified mercury sulfides (blackened).
- Salt reacts with impurities, forming soluble chlorides removed during washing.
- Limestone neutralizes acidic impurities.
- Garlic's compounds break down organic contaminants.
- Repeated washing removes residues and soluble impurities.

During Marana Process

a. Physical Changes

- Trituration converts mercury (liquid) and sulfur (powder) into a homogeneous, fine black powder (Kajjali), indicating thorough mixing and initial chemical interaction.
- Addition of aloe vera juice moistens the mixture, facilitating the shaping of Kajjali into uniform, small circular pellets.
- Heating in a sealed earthen dish (Sharava Samputa) ensures the Chakrikas solidify without direct exposure to the external environment, preventing loss of material.
- Post-heating, the Kajjali transforms into a dry, stable, ash-like substance (Rasa Bhasma), with a fine, powdery texture and altered appearance, typically reddish, brown, or white, depending on the process.

b. Chemical Changes

- Mercury chemically reacts with sulfur during trituration and heating to form Kajjali, primarily consisting of mercury sulfide.
- The reaction with sulfur detoxifies mercury, converting it into a stable, non-toxic compound suitable for therapeutic use.
- Heating initiates oxidation of any impurities and stabilizes the mercury-sulfur compound.
- Aloe vera juice aids in binding, dehydration, and biochemical interactions, enhancing the uniformity and stability of Kajjali.
- Under sealed conditions, any volatile compounds are trapped, ensuring no loss of mercury and complete conversion into the bhasma form.
- The final Rasa Bhasma becomes inert, indicating complete transformation of mercury and sulfur into a bio-compatible ash form.

Importance of Temperature While Processing

- Appropriate temperature ensures safe removal of toxic impurities without vaporizing mercury.
- Optimal heat enhances chemical interactions, such as mercury's reaction with sulfur in Kajjali formation (Marana).
- Precise temperature control prevents mercury's evaporation, preserving material integrity.
- Heat stabilizes newly formed compounds, such as mercury sulfide (HgS), ensuring safety and therapeutic efficacy.
- Consistent temperature aids homogeneity in purification (Shodhana) and ash formation (Marana).

Yoga

1. Kajjali
2. Rasa Parpati
3. Rasa Sindura
4. Shvasakuthara Rasa
5. Rasa Karpura

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Literary Review of Parada (Mercury) in Rasashastra	Dr. Shikha Sharma, P.G. Department of Rasa Shastra and Bhaishajya Kalpana, R.G.G.P.G. Ayurvedic College, Paprola Distt. Kangra, H.P.	This paper provides a concise overview of Parada (mercury), covering its history, origin, occurrence, associated doshas, grahya-agrahya lakshana (qualities for acceptability and rejection), modern perspectives, and its therapeutic applications.
2.	Parada Shodhana (Purification of Mercury) by Classical Method	Kajree Pardeshi, P.G Dept. of Rasashastra and Bhaishajya Kalpana, S D M College of Ayurveda & Hospital, Hassan, Kasrnataka, India.	The study focuses on the classical purification of Parada (mercury) to enhance its therapeutic potential, based on Rasa Tarangini's guidelines. Mercury was triturated with equal parts Sudha Churna (limestone) for 36 hours, followed by trituration with Lashuna Kalka (garlic paste) and Saindhava (salt) for 8 hours. Observations of organoleptic changes were recorded. Out of 500g of mercury, 439g was recovered after the Sudha Churna stage, and 365g after the Lashuna Kalka process. This purification method, utilizing easily accessible materials, renders mercury suitable for pharmaceutical use in various formulations.
3.	A Critical Review of Parada (Mercury) and its Toxicity	Dr. Arti, M.D. Scholar, Dept.of Agad Tantra, Rani Dullaiya Smriti Ayurveda P.G. Mahavidhyalaya Evam Chikitsalaya, Bhopal, M.P	Parada, or mercury, an inorganic metallic poison, has intrigued people for centuries as a dense liquid metal, naturally occurring in combined forms. While it has no biological role, trace amounts are present in the environment and in the food we eat. Impure mercury in soil, water, and air can lead to various health issues. However, Ayurvedic purification processes (Sanskar) detoxify mercury, making it safe for medicinal use. Despite this, modern science is phasing out many of its applications, which remain under review.
4.	A Standardized Method for Extraction of Parada (Mercury) from Hingula (Cinnabar) with the Help of Modified Nada Yantra	Karishma Varlani, PG Scholar, P. G Dept. of Rasashastra, Dr. Sarvapalli Radhakrishan Rajasthan Ayurved University, Jodhpur, Rajasthan, India	The aim of this study was to develop a standardized method for extracting Parada from Hingula (cinnabar) to maximize yield and minimize risk and loss. This research involved modifying the classical Hingullotha Parada extraction process using Nada-yantra and evaluating its SOP. Results: The modified method reduced mercury fumes and achieved a higher yield (76.8%). Conclusion: Hingullotha Parada, or mercury extraction from cinnabar, remains the most effective method. Minor adjustments to the traditional process can improve yield and enhance safety.
5.	Critical review of Parada Shodhana, Jarana and Marana processes	Amandeep Sharma, Assistant Professor, Department of Agad Tantra, Desh Bhagat Ayurvedic College & Hospital, Mandi Gobindgarh, Punjab, India.	This study focuses on the Shodhana (purification) process of Parada, including the observed changes during purification, Parada Janara, and the 16 types of Parada Marana (incineration methods).
6.	A Critical Review of Parada Samskaras in Context of Ayurvedic & Modern Concept	Dr. Manoj, Assistant Professor, Department of Rasshastra & Bhaisajya Kalpana, GS Ayurveda Medical College and Hospital Hapur, UP.	This study examines Parada Samskara from both traditional and modern perspectives. The first eight Samskaras focus on Dehavada (body transformation), while the next ten are concerned with Lohavada (metal alchemy).

Abhraka (Biotite Mica)

Introduction

- Abhraka, known as mica in English, is a principal drug in the Maharasa group of Ayurvedic substances.
- It belongs to the category of shit-silicate minerals, renowned for their shimmering and glittering appearance.
- The term mica is derived from the Latin word micare, meaning "to glitter."
- The earliest reference to Abhraka, specifically termed Vajrabhraka, is found in the Kautilya's Arthashastra from the 4th century BCE. Here, it is noted in the context of artificial gold preparation.
- Another 4thcentury BCE text, the Nyayadarshana by Acharya Gautama, also references Abhraka, underscoring its historical importance.
- In the 6thcentury lexicon Amarakosha, the term Girijamala is used to denote mica.
- In Rasashastra literature, it is often called Gauribija and is highlighted for its role in Dhatuvada (alchemy and metallurgy).
- The medicinal applications of Abhraka, particularly in Dehavada (therapeutic purposes), were first documented in the Ashtanga Hridaya.
- It appears as an ingredient in Kasisadi Taila, a formulation prescribed for external application in the treatment of Arsha Roga (piles).

Synonyms

अभ्रकं गगनं भृङ्गमभ्रं खं व्योमनामकम्।
वज्रं घनञ्च गिरिजं बहुपत्रमनन्तकम्।।
आकाशमम्बरं शुभ्रं त्वमलं गरजध्वजम्।
मेघाख्यामन्तरिक्षञ्च तदेव परिकीर्तितम्।। (R.T. 10/1-2)

Abhraka, Gagana, Bhringa, Abhra, Kha, Vyoma, Vajra, Ghana, Girija, Bahupatra, Anantaka, Akasha, Ambara, Shubhra, Amala, Garajadhvaja, Megha and Antariksha.

Mineralogical Identification

Properties	Identification
Chemical Name	Biotite Mica
Chemical Composition	$[HK_2] (MgFe)_2 (AlFe)_2 (SiO_4)_2$
Colour	Purple, Rosy, Silver, Black, White, Red, Yellowish Brown
Cleavage	Perfect
Luster	Viterous
Streak	White
Specific Gravity	2.8 – 3.0
Hardness	3- 4
Fracture	Flacky
Transparency	Opaque

Sources

- Mica is widespread and can be present in igneous, metamorphic, and sedimentary environments. Mica is mined from granitic pegmatites, which yield large crystals used in many applications.
- Large mica crystals were rare and expensive before the 19th century, as mica was not easily accessible in Europe.
- But their price dropped dramatically when large deposits had been discovered and mined in Africa and South America in the early 19th century.
- India is also a significant supplier of mica, and the main production centers are Bihar and Andhra Pradesh.
- Also, mica deposits are located in Karnataka, Rajasthan, and Madhya Pradesh.

Types

अभ्रं सितारुणश्यामपीतवर्णविभेदतः।
चतुर्विधं समाख्यातं कृष्णं तत्र गदापहम्।। (R.T. 10/3)

1. Shvetabhra
2. Raktabhra/Arunabha
3. Krishnabhra/Shyamabha
4. Pitabhra

पिनाकनागमण्डुकवज्राह्वयविभेदतः।
चतुर्विधन्तु कृष्णाभ्रं मतं रसविशारदैः।। (R.T. 10/4)

1. Pinaka Krishnabhraka

अग्नौ सन्तापित्तं यत्तु दलानि परिमुञ्चति।
रसतन्त्ररहस्यज्ञैस्तत् पिनाकं प्रकीर्तितम्।। (R.T. 10/5)

- The pinaka type of krisnabhraka is identified as abhraka that splits into pieces when exposed to fire.
- This specific variety of krishnabhraka is not suitable for therapeutic purposes and is harmful.
- If administered, it can cause debilitating constipation that may become fatal.

- It is associated with triggering any of the maharoga, including:
  - Kushtha
  - Vatavyadhi
  - Ashmari
  - Prameha
  - Udararoga
  - Bhagandara
  - Arsha
  - Grahani roga

2. Naga Krishnabhraka

पावकोत्तापित्तं यत्तु फूत्कारं परिमुञ्चति।
कुद्धाहिश्वासवच्छीघ्रं नागाभ्रं तदिहोच्यते।। (R.T. 10/7)

- The naga variety of krishnabhraka produces very loud hissing sounds, similar to a snake, when exposed to fire.
- This type of krishnabhraka is deemed dangerous for medicinal use.
- If administered, it is linked to causing severe bhagandara roga.
- It is also associated with mandala kushta roga or maha kushta roga.

3. Manduka Krishnabhraka

अग्नौ सन्तापित्तं यत्तु भेकवत्कुरुते रवम्।
उत्प्लुत्योत्प्लुत्य च पतेन्मण्डुकं तदिहोच्यते।। (R.T. 10/9)

- The manduka variety of krishnabhraka produces frog-like sounds and leaps out of fire when exposed to it.
- This variety of krishnabhraka is unsuitable for therapeutic applications.
- Prolonged use of this type can result in ashmari roga.
- Ashmari roga caused by this variety might necessitate surgical treatment.

4. Vajra Krishnabhraka

पावकोत्तापित्तं यत्तु विकृतिं नैव गच्छति।
तिष्ठत्यग्नौ भिदुरवत् वज्राभ्रं तत्प्रकीर्तितम्।। (R.T. 10/11)

- The vajra variety of krishnabhraka possesses distinctive characteristics.
- It shows no physical alterations when exposed to fire.
- It remains entirely silent and does not produce any noise under fire exposure.

Grahya Lakshana

स्निग्धं पृथुदलं वर्णसंयुक्तं भारतोऽधिकम्।
सुखनिर्मोच्यपत्रं च तदभ्रं शस्तमीरितम्।। (R.R.S. 2/11)
नीलाञ्जनोपमं स्निग्धं भारपूर्णं महोज्ज्वलम्।
निर्मोच्यपत्रं मृदुलं त्वभ्रं श्रेष्ठमिहोच्यते।। (R.T. 10/13)

- The ideal abhraka is characterized by its dark appearance, resembling nilanjana (blue-black collyrium).
- It possesses a lustrous and smooth texture, indicative of its high quality.
- This type is dense and bright, with layers that can easily be separated.
- Its surface is notably soft to the touch, adding to its distinctive properties.
- These attributes are prominently found in the variety known as Krishna vajrabhraka, considered the finest of its kind.

Doshas

Ashuddha Abharak Dosha

बाधां विदध्याद्विविधां शरीरे हत्पार्श्वपीडां तनुते नितान्तम्।
शोफं क्षयं पाण्डुगदञ्च कुष्ठं त्वशोधिताभ्रं खलु मारितं यत्।।
(R.T. 10/16)

1. Parshvapida
2. Shotha
3. Pandu Roga
4. Kushtha Roga

Treatment

उमाफलं जले पिष्ट्वा सेवते यो दिनत्रयम्।
अशुद्धाभ्रकदोषेण विमुक्तः सुखमेधते।। (R.J.Ni. 2/43)

Aatsi bija with water for 3 days.

Shodhana

Method 01

प्रतप्तं सप्तवाराणि निक्षिप्तं काञ्जिकेऽभ्रकम्।
निर्दोषं जायते नूनं प्रक्षिप्तं वाऽपि गोजले।।
त्रिफलाक्वाथिते चापि गवां दुग्धे विशेषतः। (R.R.S. 2/16-17)

1. Carefully hold thin shits of Krishna vajrabhraka using a Sandarsha Yantra (a specialized tool).
2. Place the shits over glowing charcoal and heat them until they become red-hot.
3. Immediately dip the heated shits into one of the following liquids:
   Kanji (fermented rice water)
   Gomutra (cow urine)
   Triphala Kvatha (a decoction of Triphala)
   Godugdha (cow's milk)
4. Repeat the process of heating and dipping seven times to achieve thorough purification.

5. The outcome is Shuddha Abhraka (purified Abhraka), ready for further use.

Method 02

अभ्रकं वह्निसन्तप्तं सप्तवारं निषेचितम्।
गोदुग्धे वा वराक्वाथे शुद्धिमायात्यनुत्तमाम्।। (R.T. 10/20)

1. Select Krishna vajrabhraka for the purification process.
2. Heat the Vajrabhraka shits over a flame or glowing charcoal until they turn red-hot.
3. Immediately immerse the red-hot shits into one of the following liquids:
   Godugdha (cow's milk)
   Triphala Kashaya (decoction of Triphala).
4. Repeat the heating and dipping process seven times to ensure complete purification.
5. The final product is Shuddha Abhraka (purified Abhraka), suitable for use in intended applications.

Dhanyaka Abhraka Nirmana

पादांशशालिसंयुक्तमभ्रकं कम्बलोदरे।
त्रिरात्रं स्थापयेन्नीरे तत् क्लिन्नं मर्दयेद् दृढम्।।
कम्बलाद्गलितं श्लक्ष्णं बालुकारहितञ्च यत्।
तद्धान्याभ्रमिति प्रोक्तमभ्रमारणसिद्धये।। (R.Sa.Sam 1/154)

1. Combine 1 part Shuddha Abhraka and 1/4 part shali (rice grains with husk).
2. Tie them tightly in a jute cloth or rug to form a pottali, securing it with strong thread.
3. Soak the pottali in water (or Kanji) for three nights.
4. Rub the soaked pottali vigorously in the same water, allowing the friction from the shali grains to break the Abhraka into small pieces.
5. Let the Abhraka pieces pass through the cloth and settle at the vessel's base.
6. Decant the water and dry the collected Abhraka fragments.
7. The dried fragments, called Dhanyabhraka, are ready for Abhraka Marana.

Marana

Method 01

धान्याभ्रकं समादाय रविक्षीरैर्विमर्दयेत्।
रविमूलदृवैर्वापि दिनमेकं निरन्तरम्।।
ततः संशोषयेद् घर्मे गगनं कृतचक्रिकम्।
रविपत्रैश्च संवेष्ट्य सप्तवारं विधानतः।।
पुटेद् गजपुटेनैव रसतन्त्रविशारदः।
ततो न्यग्रोधमूलोत्थैः क्वाथैर्दद्यात्पुटत्रयम्।।
तद्वद्भम्भारसेनापि सप्तवारं पुटेद्भिषक्।
एवं स्वल्पैः पुटैरेव गगनं मृतिमाप्नुयात्।। (R.T. 10/39-42)

1. Take all the ingredients as required.
2. First, triturate Dhanyaabhraka well with Arka Kshira for one day.
3. Form thin, flat chakrikas and dry them under the sun.
4. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
5. Repeat this process seven times.
6. Next, follow the same procedure, but use Nyagrodhamula Kvatha as the mardana dravya, repeating the process three times.
7. In the final phase, use Kadali Kanda Svarasa as the mardana dravya and repeat the process seven times. After this, perform the bhasma pariksha (testing of the ash).
8. If it passes, the Abhraka Bhasma is ready for internal administration.

Method- 02

क्षीरत्रयं काकमाची गोक्षुरः खरमञ्जरी।
वटप्ररोही गोमूत्रं तुलसी कदलीशिफा।।
एभिरभ्रं विमर्द्याथ दशवार पृथक् पृथक्।
पूटेत्पुटविधानज्ञः क्रमेणैव भिषग्वरः।।
शतधा पुटनादेवं रक्तोत्पलसमप्रभम्।
निश्चिन्द्रं जायते भस्म सर्वदोषविवर्जितम्।।
[R.T. 10/43-45 (Shataputvidhana)]

1. Take all the ingredients as required.
2. First, triturate Dhanyaabhraka well with Arka Kshira for one day.
3. Form thin, flat chakrikas and dry them under the sun.
4. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta. Repeat this process ten times.
5. Next, follow the same procedure for all the remaining Drava dravyas used as the mardana dravya, repeating the process ten times each.
6. In total, 100 putas are done after all the processes.
7. After this, perform the bhasma pariksha (testing of the ash). If it passes, the Abhraka Bhasma is ready for internal administration.

निश्चन्द्रङ्गारुणं स्वच्छं सुसूक्ष्मं स्पर्शकोमलम्।
अभ्रं मृतं विजानीयदसतन्त्रविचक्षणः।। (R.T. 10/55)

1. **Lustre-Free (Nishchandra)**: The bhasma should not exhibit any shine or reflective surface.
2. **Reddish Hue (Aruna Varna)**: It must have a distinct reddish color, indicating proper processing.
3. **Purity**:The bhasma should appear clean and free of any impurities.
4. **Micro-Fine Texture**: The powder should be finely ground, ensuring uniformity.
5. **Softness**: The texture should feel exceptionally soft when touched.

Amritikarna

लोहादीनां मृतानां वै शिष्टदोषापनुत्तये।
क्रियते यस्तु संस्कार अमृतीकरणं मतम्।। (R.T. 2/58)

The specialized pharmaceutical processes (Samskara) undertaken to remove residual impurities (Doshas) from any Dhatu Bhasma (incinerated metal) are collectively known as Amritikarana.

मारितं त्वतियत्नेन दशभागिकमभ्रकम्।
त्रिफलाक्वथितं चैव नवं षोडशभागिकम्।।
नागभागिकमुस्राज्य दत्वा लोहस्य भाजने।
पाचनाज्जायते रम्यममृतीकरणं वरम्।। (R.T. 10/68-69)

Ingredients

1. Take 10 Parts of Abhraka Bhasma, 16 Parts of Triphala Kashaya, 8 Parts of Goghrita (cow's ghee)
2. Take the specified quantities of all ingredients in an iron vessel (kadhahi).
3. Place the vessel over a mild flame and cook the mixture.
4. Stir frequently to ensure uniform heating and prevent sticking.
5. Continue cooking until all the liquid content evaporates, leaving behind a dry mixture.
6. Collect the dried powder of Abhraka Bhasma from the vessel.
7. Store the prepared powder in a suitable airtight container to maintain its potency.

अरुणभस्मनस्तु पुनरमृतीकरणेन गुणवृद्धिर्वर्णहानिश्च भवति।
(Ay.Pra. 2/135)

Amritikarana enhances the properties (Guna vriddhi) of the bhasma and causes depletion in its colour.

Lohitikarna

गाङ्गेरुकी भद्रमुस्ता वटक्षीरन्तथैव च।
वटमूलजलं वापि हरिद्राया द्रवस्तथा।।
समङ्गाक्वथितञ्चैव घनमेभिः सुपेषयेत्।
पुटद्वयं त्रयं वापि वितरेद्भिषजां वरः।।
निश्चन्द्रिकञ्च मृदुलं रक्तोत्पलसमप्रभम्।
गगनस्य भवेद्भस्म ततः कार्येषु योजयेत्।। (R.T. 10/65-67)

If the abhraka bhasma does not attain a red color (similar to japakusuma) after incineration, follow these steps:

1. Triturate the bhasma with any one of the following liquids:
   - Gangeruka (Grewia tenax) kvatha
   - Musta kvatha
   - Vata-kshira (Banyan tree latex)
   - Vata mula svarasa (Juice from banyan root)
   - Haridra svarasa or kvatha (Turmeric juice or decoction)
   - Manjistha kvatha (Indian madder decoction)
   - Lajjalu kvatha (Mimosa pudica decoction)
2. Subject the triturated mixture to 2 or 3 gajaput a (high-temperature heating cycles).
3. The bhasma should now attain the desired red color.
4. It will become lustre-free, smooth, and soft to the touch.

Dose

125 mg to 375 mg

Anupana

Honey, Ghee, Triphala Kvatha, Guduchi Svarasa, Adraka Svarasa.

Properties

अभ्रं स्निग्धं परमशिशिरं स्वादु चायुष्यमाग्र्यं केश्यं वर्ण्यं रुचि-करमलं दीपनं चातिबल्यम्।
नेत्र्यं मेधां जनयतितरां स्तन्यसंवर्द्धनञ्च क्षेत्रे स्थैर्य्यं वितरति परं दीपनं पुष्यकेतोः।।
क्षिप्रं घोरां दलयति महारोगसंघातभीतिं स्वान्ते प्रीतिं जनयति परं नर्महासे च यूनः।
देहे शक्तिं वितरतितरां बह्वपत्यप्रदात्री कार्यालस्यं हरति सुतरामभ्रकं सेव्यमानम्।। (R.T. 10/72-73)

- **Rasa**: Madhura
- **Guna**: Snigdha

- **Virya**: Shita
- **Vipaka**: Madhura
- **Dosha**: Vata-Pittahara
- **Karma**: Rasayana, Ayushya, Balya, Netrya, Medhya, Dipana, Keshyam.
- **Therapeutic Uses**: Agnimandya, Grahani, Shvasa, Raktapitta, Kasa, Prameha, Pandu, Keshapatina, Tvakroga, Jara, Napumsakta, Kushtha, Pliha, Udara, Visha, Krimi Roga.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Surface contaminants are dislodged during heating and quenching.
- Shits become brittle due to thermal stress.
- Microcracks form, aiding pulverization.
- Liquids wash away loosened impurities.

b. Chemical Changes

- Heating oxidizes impurities, neutralized by quenching.
- Quenching liquids dissolve and remove toxins.
- Heat breaks down unstable impurities.
- Quenching liquids enhance therapeutic properties.

During Marana Process

a. Physical Changes

- Abhraka loses its laminar structure, becoming fine and brittle.
- Changes to a uniform ash-like texture with altered color.
- Repeated grinding and heating ensure consistency.

b. Chemical Changes

- Metallic impurities convert to stable oxides.
- Liquids enrich Abhraka with therapeutic properties.
- Heat breaks down impurities.
- Forms safe, bio-compatible mineral compounds.

Importance of Temperature While Processing

- High temperatures during Shodhana oxidize and loosen impurities, enabling their removal during quenching.
- Controlled heating in Marana alters the crystalline structure of Abhraka, making it brittle and easier to process.
- Optimal temperatures promote oxidation, decomposition of toxins, and formation of stable compounds like silicates and oxides.
- Heating enhances the absorption of bioactive compounds from grinding liquids (mardana dravyas) into Abhraka.
- Precise temperature regulation prevents excessive decomposition or loss of essential minerals.
- Consistent heating ensures even purification and bhasma formation for therapeutic efficacy.
- Temperature plays a critical role in detoxifying Abhraka, achieving chemical stability, and enhancing its medicinal value.

Yoga

1. Arogyavardhini vati
2. Gagana parpati
3. Panchamrita parpati
4. Prabhakara vati
5. Yogendra rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Conceptual Review of Abhraka (Biotite) - An Ayurvedic View	Pankaj Rai, Associate Professor, Department of Rasa Shastra and Bhaishjaya Kalpana, Major S D Singh Ayurvedic Medical College and Hospital, Farrukhaabad, Uttar Pradesh, India.	Abhraka (Biotite) is one of the effective metals in Ayurveda to use as pharmaceuticals since ancient time, this study conclude. Abhraka is being a recognized as rasayan in antiquities and the preserver of these extremely untreatable diseases even. Different authors have included it in different groups. It was well-known in its various forms and pharmaceutical preparations from classical texts. Detailed analytical and biological studies on Abhraka has been performed by various researchers with reports that it is likely a strong immunodialator drug.

Sr.No.	Article Name	Author Name	Result
2.	Pharmaceutical Analysis of Abhraka Shodhana by Nirvapa in Different Media	Dr. Hemang Trivedi Post Graduate, Dept of Rasashashtra and Bhaishajya Kalpana, Parul Institue of Ayurved, Parul University.	The study demonstrates Shodhana as a purification process for metals and minerals, enhancing therapeutic efficacy by removing impurities. Four methods from Rasaratna Samuchchaya were used to purify Abhraka (mica): • Method 1: Quenching 150 g Abhraka in cow's milk, yielding 80.44% purity. • Method 2: Using Go-mutra (cow urine), yielding 79.77% purity. • Method 3: Using Triphala Kvatha (herbal decoction), yielding 78.44% purity. • Method 4: Using Kanji (fermented rice water), yielding 79.33% purity. • Result: The highest yield (80.44%) was obtained with cow's milk as the quenching medium.
3.	Pharmaceutical and Analytical Study of Abhrak Bhasma	Nandurkar Vishal Marotrao Associate Professor, Department of Ras shastra & Bhaishajya Kalpana, Shri K. R. Pandav Ayurved College, Dighori, Nagpur, Maharashtra, India.	The present work deals with Abhraka Bhasma preparation by sequential Gajaputa. 5 homogeneous Gajaputa processed the bhasma color was black, shape hard and weight increased. From the softened 11th Puta, it achieved Rekhapurnatva and was black-grey in color. The bhasma was brick red and completely softened with less Chandrika from 18th to the 23rd Puta. The targeted color of Sindurabha was appeared by the 24th Puta, and full body loss of Chandrika achieved by the 34th Putap. For therapeutic augmentation, Further Puta (35–40) was given which resulted in Abhraka Bhasma which turned out to be Nishchandra, Sindurabha-coloured, Sookshma, Rekhapurna, Sparshakomal, Nirdhum and Niswadu. Contemporary analyses of L.O.D., L.O.I., pH, conductivity, solubility and Fe2+/Fe3+ assay were additionally performed as well.

Makshika (Chalco-Pyrite)

Introduction

- Makshika is classified as the third mineral drug in the maharasa group of Ayurvedic substances.
- References to Makshika date back to the Samhita Kala period, highlighting its long-standing use in Ayurvedic medicine.
- The Charaka Samhita, the oldest text among the Brihattrayi (three major classical Ayurvedic texts), mentions Makshika in various compound formulations.
- Over time, Makshika has been extensively documented in numerous Chikitsa Granthas (therapeutic texts) of Ayurveda.
- Rasa Granthas (alchemical texts) provide detailed information on the preparation and use of Makshika.
- Makshika belongs to the pyrite family, a group of iron sulfide minerals known for their distinctive metallic luster.
- The name "pyrite" is derived from the Greek word purites, meaning "of fire" or "in fire," reflecting its ability to produce sparks when struck against metal.
- Pyrite commonly forms in association with other sulfides or oxides.
- It is found in various geological settings, including:
  - Quartz veins
  - Sedimentary and metamorphic rocks
  - Coal beds
  - Fossils, where it may act as a replacement mineral
- Two major varieties in this mineral are;

1. **Svarna Makshika**: Copper pyrite or Chalcopyrite ($CuFeS_2$)
2. **Rajata Makshika**: Iron pyrite (FeS_2)

Mineralogical Identification

Properties	Identification
Chemical Name	Copper Pyrite
Chemical Composition	$CuFeS_2$
Colour	Brass Yellow
Cleavage	Poor
Luster	Metallic
Streak	Greenish Black

Properties	Identification
Specific Gravity	4.2
Hardness	3.5 – 4
Fracture	Concholdal
Transparency	Opaque

Sources

Makshika deposits are located globally, with notable occurrences in the United States, United Kingdom, Spain, Canada, and Japan. In India, significant sources are found in Bihar, Rajasthan, and Andhra Pradesh.

Types

Makshika - two types

1. Svarna Makshika (Chalcopyrite or Copper pyrite) (CuFeS,)
2. Rajata Makshika (Iron pyrite) (FeS,)

Depending on the colour – 3 types

1. Pita Makshika- Svarna Makshika
2. Shukla Makshika- Rajata Makshika
3. Rakta Makshika- Kamsya Makshika

Synonyms

Svarna makshika- synonyms

सुवर्णमाक्षिकं स्वर्णमाक्षिकं हेममाक्षिकम्।
माक्षीकं माक्षिकञ्चैव ताप्यञ्च धातुमाक्षिकम्।।
माक्षीकधातुञ्च तथा तापीजञ्चापि तन्मतम्। (R.T. 21/1-2)

Suvarna Makshika, Svarna Makshika, Hema Makshika, Makshika, Tapya, Dhatu Makshika, Makshika dhatu, Tapija (as it is obtained on the banks of river Tapi

Rajata Makshika - Synonyms

रौप्यमाक्षिकमाख्यातं तारजं तारमाक्षिकम्।
विमलं श्वेतमाक्षीकं तथा रजतमाक्षिकम्।।
ईषद्रौप्यस्य साहित्याद् वा रौप्यगुणसाम्यतः।
रौप्यवद् द्युतिमत्त्वाद्वा रौप्यमाक्षिकमुच्यते।। (R.T. 21/55-56)

Roupya- Makshika, Taraja- Makshika, Tara-Makshika, Vimala- Makshika, Shveta- Makshika and Rajata- Makshika.

Grahya Lakshana

Svarna Makshika

स्निग्धं गुरु श्यामलकान्ति किञ्चित् कषे सुवर्णद्युतिसुप्रकाशम्।
कोणोज्झितं स्वर्णसमानवर्णं सुवर्णमाक्षीकमिह प्रशस्तम्।।
(R.T. 21/4)

1. Exhibits snigdha (smooth) and guru (heavy) properties.
2. Displays a distinct bluish or blackish hue on its surface.
3. Possesses a prominent golden color overall.
4. When rubbed against a hard surface, it leaves visible golden streaks.
5. Lacks sharp angles or rough edges, ensuring a smooth, uniform texture.

Rajata Maksika

स्निग्धं सकोणं गुरु च वर्तुलं रजतोज्ज्वलम्।
रौप्यवच्चाकचिक्याढ्यं जात्यं तद्रौप्यमाक्षिकम्।। (R.T. 21/57)

1. Displays snigdha (smooth) texture with defined angles.
2. Has a heavy, dense composition.
3. Typically round or rounded in form.
4. Exhibits a silver-like shine and radiant luster.
5. Only samples meeting these characteristics are deemed grahya (acceptable) for medicinal applications.

Agrahya Lakshana

Svarna Makshika

खरं परं वै गुरुताविहीनं प्रवृत्तकोणं खरलोहकाभम्।
प्रकीर्तितं तत्परिहेयमेव सुवर्णमाक्षीकमिहामयज्ञैः।। (R.T. 21/5)

1. Has a rough or uneven surface.
2. Lightweight, lacking the required heaviness.
3. Features sharp angles rather than a smooth, rounded body.
4. Displays the luster of khara loha (base or inferior metal) instead of a golden radiance.

Rajata Makshika

समलं लघु रूक्षञ्च कषेऽतिमलिनच्छवि।
अवर्तुलं विवर्णञ्च हेयं स्याद्रौप्यमाक्षिकम्।। (R.T. 21/58)

1. Exhibits an unclean and dry surface texture.
2. Lighter than expected, indicating inferior quality.
3. Leaves dull or dirty streaks when rubbed on a hard surface.
4. Lacks a round form, appearing irregular or angular.
5. Has a pale, lackl uster color instead of a radiant silver sheen.

Doshas

Asuddha & Apakva Svarnamakshika Bhasma Sevanajanya Dosha

अपक्वमाक्षिकेणाशुदेहे संक्रमते रुजा।
तद्दोषं विनिवृत्यर्थमनुपानं ब्रवीम्यऽहम्।।
(Br.R.R.Su., p. 107)

Ruja (Pain)

अशोधितं वाऽमृतमप्यशुद्धं निषेवितं माक्षिकमक्षिबाधाम्।
प्रन्दानलं कुष्ठहलीमकदीन् कोष्ठानिलं वै जनयोन्नितान्तम्।।
(R.T. 21/6)

- Netravikriti
- Mandaagni
- Kushtha
- Halimaka
- Kostha (Vataja Prakupita)

Treatment

कुलत्थस्य कषायेण माक्षीकविकृतिं जयेत्।
दाडिमस्य त्वचो वाऽपि प्रोक्ता विकृतिनाशिनी।।
(Bri.R.R.Sun., p. 107)

Kulatha kvatha or Dadima twak kvatha is taken as treatment

Shodhana

Svarna Makshika

a. Method 01

एरण्डतैललुङ्गाम्बुसिद्धं शुद्ध्यति माक्षिकम्।
सिद्धं वा कदलीकन्दतोयेन घटिकाद्वयम्।। (R.R.S. 2/83)

1. Tie powdered Svarna Makshika in a cloth to form a pottali.
2. Suspend the pottali in a dolayantra with one of the following liquids:
   - Eranda taila (castor oil)
   - Matulunga svarasa (citrus juice)
   - Kadali kanda svarasa (banana stem juice)
3. Heat the setup over a mild fire for 6 hours.
4. Remove, wash, and dry the pottali contents.
5. Store the purified Svarna Makshika in an airtight container for pharmaceutical use.

b. Method 02

तप्तं क्षिप्तं वराक्वाथे शुद्धिमायाति माक्षिकम्।। (R.R.S. 2/83)

1. Collect pieces of Svarna makshika and prepare a fresh decoction of triphala kvatha.
2. Heat the Svarna makshika pieces until they become red hot.
3. Immediately drop the red-hot pieces into the vessel containing the freshly prepared triphala kvatha.
4. Repeat the heating and quenching process 7 times.
5. After 7 cycles, Shuddha Svarna makshika is obtained, ready for pharmaceutical applications.

Rajata Makshika Shodhana

a. Method 01

मेषशृङ्गीरसेनापि दोलायन्त्रे विधानतः।
पाचितं रौप्यमाक्षीकं शुद्धिमायात्यनुत्तमाम्।। (R.T. 21/66)

1. Take pieces of Grahya Rajata Makshika and tie them in a cloth to make a pottali.
2. Suspend the pottali in a dolayantra containing meshashrigi rasa as the liquid medium.
3. Place the dolayantra over a mild fire and cook the setup for two yama (6 hours).
4. Allow the setup to cool naturally.
5. Once cooled, take out the drug from the pottali, wash it thoroughly, and dry it well under sunlight.
6. Crush and powder the dried material. Store it in a suitable airtight container as shuddha rajata makshika for further pharmaceutical use.

Svarna Makshika Marana

a. Method no-01

माक्षिकस्य चतुर्थांशं गन्धं दत्त्वा विमर्दयेत्।
ऊरुबूकस्य तैलेन ततः कुर्याच्च चक्रिकाम्।।
शरावसम्पुटे कृत्वा पुटेद् गजपुटेन तु।
सिन्दूराभं भवेद् भस्म माक्षिकस्य न संशयः।।
(R.Ra.San 1/211-212)

1. Take all the ingredients as required.
2. First, triturate Shuddha Svarna Makshika and Shuddha Gandhaka triturated.
3. Add Eranda Taila as Marana Drava dravya for one day.
4. Form thin, flat chakrikas and dry them under the sun.
5. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
6. This process is done by ten times. If more putas are needed, repeat this process until the bhasma passes the bhasma pariksha.

b. Method-02

ताप्यं निम्बस्वरसम्यक्त्वं पुनर्निम्बूकवारिणा।
सम्पेष्य सम्पुटस्थन्तु पुटयेत् कृतचक्रिकम्।।
एवं दशपुटैरेव पञ्चतामेति माक्षिकम्।
रक्तोत्पलदलच्छायं जायते चातिशोभनम्।। (R.T. 21/19-20)

1. Take all the ingredients as required.
2. First, triturate Shuddha Svarna Makshika with Nimbu Svarasa for one day.
3. Form thin, flat chakrikas and dry them under the sun.
4. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
5. Repeat this process for ten times or until the bhasma passes the bhasma pariksha.

Rajata Makshika Marana

स्वर्णमाक्षिकवत्कार्यं रौप्यमाक्षिकमारणम्।
प्रयोगाल्पतया चास्य व्याख्यानं नाधिकं कृतम्।। (R.T. 21/68)

The procedures for the incineration of Rajata makshika are the same as that of the procedures for the incineration of Svarna makshika. Since, the Rajata makshika is used less for therapeutic purpose so more explanation in this regard is not so important.

Dose

गुञ्जार्द्धतः समारभ्य बलकालाद्यपेक्षया।
गुञ्जाद्वितयपर्यन्तं माक्षिकं योजयेद्भिषक्।। (R.T. 21/29)

Dose : ½ - 2 ratti (62 mgs - 250 mgs)

Anupana

अनुपानं वरा व्योषं वेल्लं साज्यं हि माक्षिके। (Ay.Pra. 4/10)

Triphala churna, Trikatu churna, Vidanga churna, Ghee or Honey.

Properties

Svarna Makshika

सुवर्णमाक्षिकं वृष्यं मधुरं तु रसायनम्।
तिक्तं स्वर्यञ्च चक्षुष्यं त्रिदोषाघ्नं परं मतम्।।
क्षयमर्शांसि मेहानि विविधा बस्तिवेदनाः।
पाण्डुश्वयथुकुष्ठानि विषदोषादिकान् हरेत्।।
जीर्णज्वरमपस्मार मन्दानलमरोचकम्।
अनिद्रां नाशयत्याशु योगवाहि परं मतम्।। (R.T. 21/26-28)

Rajata Makshika

स्वर्णमाक्षिकवज्ज्ञेया विमलस्य गुणा बुधैः।
मात्रां चामयिकं योगं तथैव परिलक्षयेत्।। (R.T. 21/69)

- **Rasa**: Madhuram, Tikta
- **Guna**: Laghu, Ruksha
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Tridoshaghna
- **Karma**: Rasayana, Vrishya, Svarya, Yogavahi, Chakshushya.
- **Therapeutic Uses**: Pandu, Shotha, Prameha, Jirna Jvara, Rajayakshma, Anidra, Apasmara, Rajahkrichchhra, Kushtha, Arsha, Krimi.

Probable Physico-Chemical Changes

During the Shodhana process

a. Physical Changes

- Grinding and heating result in finer particles.
- Heating (red-hot) and quenching alter the color, indicating oxidation.
- Surface and structural impurities are eliminated.
- Becomes porous and softer for pharmaceutical use.

b. Chemical Changes

- Harmful elements like arsenic and sulfur are leached or neutralized.
- Sulfides are converted to less toxic oxides.
- Acidic liquids and Triphala Kvatha neutralize toxins and stabilize heavy metals.
- Structural modifications enhance therapeutic efficacy.

During the Marana Process

a. Physical Changes

- Svarna Makshika is ground into a fine powder.
- Turns reddish (Sindurabha or lotus petal-like hue) due to oxidation.
- Becomes soft and brittle after repeated putas.
- Impurities and volatiles are removed.
- Ingredients mix uniformly.

b. Chemical Changes

- Sulfides convert to oxides (e.g., ferric oxide, cupric oxide).
- Shuddha Gandhaka integrates chemically.
- Harmful elements like arsenic are neutralized.
- Media like Nimbu Svarasa aid detoxification and reaction.

- Mineral components are stabilized, enhancing bioavailability.
- Calcination transforms it into therapeutic bhasma passing all Bhasma Pariksha tests.

Importance of Temperature While Processing

Importance of Temperature in Shodhana

- Aids in removing toxins like arsenic and sulfur.
- Moderate heat helps dissolve impurities into the medium.
- Activates reactions for neutralization of harmful elements.
- Prevents degradation or loss of therapeutic properties.

Importance of Temperature in Marana

- Converts sulfides to bioavailable oxides (ferric, cupric oxide).
- Ensures uniform incorporation of Gandhaka.
- High heat calcines material into microfine bhasma.
- Stabilizes therapeutic compounds.
- Ensures complete chemical transformation without over-burning.

Yoga

1. Chandraprabha vati
2. Ratnagarbha pottali
3. Panchamrita parpati
4. Grahanikapata rasa
5. Jayamangala rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review on Svarna Makshika	Centre for Advanced Research in Indian System of Medicine, Sastra University, Thanjavur-613401, Tamil Nadu, India	This study examines Svarna Makshika (Chalcopyrite), a copper-rich mineral historically used in Ayurveda and referenced in classical texts like Charak Samhita and Sushruta Samhita. Known for its therapeutic role, Svarna Makshika contains copper, iron, and sulphur. However, due to sourcing challenges, Roupya Makshika (Vimala) is now often used as a substitute. This review explores its historical significance, composition, and medicinal applications.
2.	Pharmaceutical standardization of Svarna Makshika Bhasma (Processed Copper Pyrite): A traditional medicine of Indian subcontinent	Vandana Meena, Department of Rasa Shastra and Bhaishajya Kalpana, Faculty of Ayurveda, Institute of Medical Sciences,Banaras Hindu University, Varanasi 221005, (U.P.), India	This study focuses on the pharmaceutical standardization of Svarna Makshika Bhasma, a traditional Indian medicine derived from processed copper pyrite (Svarna Makshika). Svarna Makshika Bhasma is historically valued in Ayurveda for its therapeutic benefits. This standardization aims to ensure consistency in preparation, composition, and safety of the Bhasma, preserving its efficacy and authenticity for medicinal use.
3.	Process standardization of Svarna Makshika Shodhana (purification) in Triphala Kvatha (decoction	Krushn Kumar Taviad, Dept. of RSBK, Institute for Post Graduate teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar.	Following Rasaratna Samuchchhaya methods, Svarna Makshika (SM) was purified in three 600 g batches through seven quenches in Triphala Kvatha (decoction of Terminalia chebula, Terminalia bellirica, Phyllanthus emblica), with records maintained. After purification, SM transformed into a dark black, coarse powder with decreased hardness and increased brittleness, yielding an average of 532 g (88.67%) per batch. The process was efficient, with increased pH, specific gravity, and solid content observed in the Kvatha, and took an average of 24.81 minutes to reach the red-hot stage.

Shilajatu (Asphaltum Punjabianum)

Introduction

- Adrija or Shilajatu (Shilajita) is the fifth mineral drug in the maharasa group. The term combines shila (rock/mountain) and jatu (resin) derived from Himalayan regions.
- Also called Black bitumen or Asphaltum punjabinum, a sticky, viscous liquid or semi-solid found in crude petroleum or natural deposits.
- Terms asphalt and bitumen are used interchangeably. Naturally occurring asphalt is known as "crude bitumen".
- Mentioned in Samhita period and all brihattrayi, prominently in prameha roga.
- Maharshi Charaka cites 4 types; Maharshi Sushruta lists 6.

सूर्यसन्तापसन्तप्ताः शिलाः शैलाधिपस्य यद्।
गाढं मुञ्चन्ति निर्यासं तच्छिलाजतु कीर्तितम्।।

शैलाधिपशिलासारो निर्गतो रवितापतः।
शुष्कः सम्मूर्तितां यातः शिलाजतु निगद्यते।। (R.T. 22/62-63)

- During the hot summer months (April and May), temperatures in the Himalayan range rise significantly.
- The intense heat causes a thick, viscous essence to ooze from the surface of the Himalayan rocks.
- This essence dries naturally and accumulates in the crevices between the rocks.
- The substance, resembling black coal in texture and color, is identified as Shilajatu.
- The fierce summer sun extracts this blackish essence from the Himalayan rocks, which dries and settles in rock cleavages.

Synonyms

शिलाजतु च शैलेयं शिलाजं शैलधातुजम्।
शिलामयः शिलास्वेदः शिलानिर्यास इत्यपि।।
अश्मजं त्वश्मजतुकं गिरिजं त्वद्रिजं तथा।
अश्मोत्थमश्मलाक्षा च गैरेयञ्च मतन्तु तत्।। (R.T. 22/60-61)

Shilajatu, Shaileya, Shilaja, Shaila-Dhatuja, Shilamaya, Shilasveda, Shilaniryasa, Ashmaja, Ashmajatuka, Girija, Adrija, Ashmottha, Ashmalasksha and Gaireya.

Mineralogical Identification

a. Gomutra Gandhi Shilajatu

Properties	Identification
Colour	Brownish Black
Odour	Gomutra Gandha
Specific Gravity	1 – 1.8
Melting Point	90- 100 degree C

b. Kapura Shilajatu

Properties	Identification
Chemical Name	Potassium Nitrate
Chemical Composition	KNO_3
Colour	White
Cleavage	Very Poor
Luster	Vitreous
Streak	White
Specific Gravity	2 – 3
Hardness	1 – 2
Fracture	Brittle
Transparency	Transparent

Sources

ग्रीष्मेऽर्कतप्ता गिरयो जतुतुल्यं वमन्ति यत्।
हेमादिषड्धातुरसं प्रोच्यते तच्छिलाजतु।। (A.Hr.U. 39/130)

- According to Ashtangahridaya, the intense heat during summer causes mountain stones to become extremely hot under the sun.
- Due to this heat, a wax-like substance begins to exude from the stones.
- This exudate carries the essence of six types of metals, including gold and silver.
- The resulting substance is referred to as Shilajatu.

ग्रीष्मे तीव्रार्कतप्तेभ्यः पादेभ्यो हिमभूभृतः।
स्वर्णरूप्यार्कगर्भेभ्यः शिलाधातुर्विनिःसरेत्।। (R.R.S. 2/110)

- In summer, heat of intense sun rays causes shilajatu to ooze out from the rocks, which consist the metals like gold, silver, copper etc., which are present at the base of Himalaya Mountain.
- In the Kumaon Region of Uttarakhand, it is also seen oozing out of the lime stones of the mountains surrounding Sarayu and Ramaganga.
- Besides these regions, it is available in Nepal, Kashmir and Punjab as well.

Types

शिलाजतुर्द्विधा प्रोक्तो गोमूत्राद्यो रसायनः।
कर्पूरपूर्वकश्चान्यस्तत्राऽद्यो द्विविधः पुनः।।
ससत्त्वश्चैव निःसत्त्वस्तयोः पूर्वो गुणाधिकः। (R.R.S. 2/109)

2 types:

1. Gomutragandhi Shilajatu (Black bitumen)
   - Sasattva
   - Nihsattva
2. Karpuragandhi Shilajatu (Potassium nitrate)

Grahya Lakshana

1. A small piece of Shilajatu placed on glowing charcoal should not emit any smoke.
2. The substance should melt and expand, taking the shape of a linga.
3. When dropped into a bowl of still water, it should sink steadily, resembling the descent of threads.
4. Despite sinking, it should remain insoluble in water.
5. It should exhibit the tastes of katu (pungent) and tikta (bitter).

Doshas

Ashuddha Shilajita Sevanajanya Dosha

अशुद्धं दाहमूर्च्छादीन् भ्रमपित्तास्रशोणितं शिलाजतु प्रकुरुते मांद्यमग्नेश्चविद्ग्रहं।। (Bri.R.R.Sun., p. 182)

Daha, Murchchha, Bhrama, Raktapitta, Raktavikara, Mandaagni, Mala-avrodha.

Treatment

मरिचं घृत संयुक्तं सेवये द्दिनसप्तकम्।
शिलाजतु भवद्दोषं शान्तिमाप्नोतिनिश्चितम्।।
(Bri.R.R.Sun., p. 182)

Maricha with Ghrita for Seven Days.

Shodhana

Method 01

विगताम्बुदे निवाते धरणीतलप्रदेशे।
प्रखरे निदाघकाले प्रणयेच्छिलाजशुद्धिम्।।
विमलानि भाजनानि त्वयसा विनिर्मितानि।
युगसंमितानि तीव्र निदधीत सूर्यतापे।।
सुविचूर्णितं शिलाजं विनिधाय पात्रमध्ये।
द्विगुणं प्रतप्तनीरं त्रिफलाकषायमर्द्धम्।।
गिरिजे प्रदाय यामं निदधीत तीव्रतापे।
कामं विमर्ध गिरिजं विदधीत वस्त्रपूतम्।।
विनिधाय पूर्वपात्रे निदधीत तीव्रतापे ।
अथ त्रीव्रतापयोगाद्विमलं सरं प्रकाशम्।।
मृदुलं प्रगाढकृष्णं यदुपैति नीरपृष्ठे।
विदधीत सोष्णतोये खलु भाजनेऽपरस्मिन्।।
अथ वै द्वितीयपात्रात् खलु भाजने तृतीये।
अथ भाजनात्तृतीयात् निदधीत तुर्यपात्रे।।
सलिलं तु यावदच्छं न भवेत्तु तावदेवम्।
विदधीत वैद्यवर्यः सततं कृतावधानः।।
सलिलं भवेद्यदाच्छं मलमेत्यधः प्रदेशे।
सलिलोर्ध्वभागसंस्थं गिरिजं हरेद्विशुद्धम्।। (R.T. 22/69-77)

1. The powder of Shilajatu (stone) is vigorously mixed with hot water to disengage the soluble matter.
2. It is then allowed to settle, and the supernatant suspension is decanted and concentrated into a thick paste or solid amorphous substance.

Other Method

1. Shilajatu is mixed with double the quantity of water and half the quantity of Triphala Kvatha, and then carefully boiled to dryness.

Method 02

क्षाराम्लगोजलैर्धौतं शुद्ध्यत्येव शिलाजतु। (R.R.S. 2/117)

1. Choose an appropriate purifying liquid such as kshara drava (alkaline liquid), Amla drava (sour liquid), or gomutra (fresh cow's urine).
2. Add the Shilajatu to a sufficient quantity of the chosen liquid.
3. Stir the mixture thoroughly to ensure proper contact between the Shilajatu and the liquid.
4. Filter the mixture into larger trays to remove impurities.
5. Place the filtered Shilajatu under sunlight to dry completely.
6. The final product, Shuddha Shilajatu, is obtained for further use.

Dose

12- 48 gms (Acharya Charaka)

Anupana

Godugdha, Takra, Masma Rasa, Jala, Go-mutra.

Properties

शिलाजतु मतं तिक्तं विपाके कटुकं तथा।
मूत्रलञ्च विशेषेण योगवाहि रसायनम्।। (R.T. 22/84)
जराव्याधिप्रशमनं देहदार्ढ्यकरं परम्।
मेधास्मृतिकरं बल्यं क्षीराशी तत्प्रयोजयेत्।। (Ch.Chi. 1/3/53)

- **Rasa**: Tikta
- **Guna**: Laghu, Ruksha
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Tridoshaghna
- **Karma**: Yogavahi, Mutrala, Rasayana, Vrishya, Balaya, Medhya, Jara.
- **Therapeutics**: Jvara, Pandu, Prameha, Agnimandya, Gulma, Hridshula, Tvak Roga.

Probable Physico-Chemical Changes

During the Shodhana Process

a. Physical Changes

- Visible solid impurities (e.g., stones, dirt) are separated during stirring and filtration.
- The dark, sticky mass of Shilajatu becomes cleaner and often more uniform in appearance after purification.
- The purified Shilajatu becomes smoother and less gritty, making it easier to use medicinally.

- Sun drying removes excess water, leaving a solidified, concentrated product.
- Uniform mixing during stirring ensures even purification.

b. Chemical Changes

- Alkaline (Kshara Drava), acidic (Amla Drava), or gomutra media neutralize toxic substances and reduce harmful microbial contamination.
- Soluble impurities (e.g., excess salts, water-soluble toxins) dissolve into the liquid medium and are removed during filtration.
- Organic and inorganic toxins, including heavy metals, are chemically altered or rendered inert through interactions with the purifying liquid.
- Interaction with the chosen purifying liquid balances the pH of Shilajatu, enhancing its bioavailability.
- Beneficial compounds like fulvic acid and humic acid remain intact or are concentrated, improving the therapeutic quality.

Importance of Temperature while Processing

- Moderate warmth enhances the interaction between Shilajatu and the purifying liquid (e.g., alkaline or sour media), aiding in the removal of toxins and impurities.
- Heating helps dissolve water-soluble impurities, salts, and unwanted organic substances into the purifying medium, ensuring effective filtration.
- Temperature facilitates reactions between Shilajatu and the purifying liquid, neutralizing harmful components while preserving active constituents like fulvic acid.
- Slight heating makes Shilajatu less sticky and more pliable, improving mixing and filtration.
- Controlled temperature ensures beneficial compounds (e.g., humic acid, fulvic acid) are not destroyed, preserving Shilajatu's medicinal properties.
- Gentle heat during sun drying or controlled drying methods prevents over-drying or loss of active components while solidifying purified Shilajatu.

Yoga

1. Lankeshvara rasa
2. Yogaraja rasa
3. Sarvamehantaka rasa
4. Puranachandra rasa
5. Arogyavardhini rasa
6. Chandraprabha vati

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Literary Review of Shilajatu	Sharma Amit Kumar, Ph.D Scholar, Department of Rasashastra & Bhaishajya Kalpana, NIA, Jaipur (RAJ.)	Shilajatu is a humus-rich, blackish-brown substance widely used in Ayurveda as a potent tonic with diverse therapeutic applications. Though its exact origin is debated, many believe it is derived from plant sources in mountain rocks. Tastelessly neither sour nor does astringent, Shilajatu become pungent after digestion. In Sanskrit, it is called the "conqueror of mountains and destroyer of weakness." Charaka Samhita states it can treat nearly all curable diseases. Traditionally, Shilajatu enhances vitality, treats diabetes, and addresses various other ailments in Ayurvedic medicine.
2.	Shilajatu Shodhana - A brief review	Dr. Kaveri Borkar, Post Graduate Scholar, Dept. of Rasashastra and Bhaishajya Kalpana, Shri Vivekananda Nursing Home Trust's, Ayurveda Mahavidyalaya and Hospital, Rahuri, Maharashtra, INDIA	Classical Ayurvedic texts outline diverse purification methods for Shilajatu, each with specific therapeutic uses. This review examines three main Shodhana techniques—Dhavana (washing), Bhavana (impregnation), and Swedana (steaming)—as described across texts like Charaka Samhita, Sushruta Samhita, and Rasaratnasamucchaya, each utilizing unique media and procedures.
3.	Clinical Evaluation of Shilajatu in Diabetes Mellitus	Neha Lamba, Assistant Professor, Department of Kayachikitsa, BK Ayu. Medical College, Daudhar, Moga, Punjab.	This study assessed the clinical efficacy of Shilajatu in managing Prameha (diabetes) in 22 patients. Significant improvements were observed in fasting blood glucose (FBS), post-prandial blood glucose (PPBS), urine sugar, glycosylated hemoglobin, and quality of life ($p < 0.001$). Subjective symptoms such as Shaithilya, Mukha Sosha, Sandhi Shoola, Prabhuta Mutrata, Pipasa, and Kshudha showed highly significant improvement ($p < 0.001$). The results suggest that Shilajatu is effective in managing Prameha.

Gandhaka (Sulfur)

Introduction

- Gandhaka (sulphur) is recognized as the foremost mineral drug in the uparasa group.
- It is a multivalent, abundant non-metal.
- In its native state, sulphur is a yellow, crystalline solid that is both odourless and tasteless.
- Sulphur is highly reactive and forms compounds with nearly all elements except for gases, gold, and platinum under favorable conditions.
- Sulphur exists in multiple allotropes such as rhombic, monoclinic, polymeric, and others.
- The rhombic structure is the most prevalent allotrope.
- Each allotropic form exhibits unique physical constants including solubility, specific gravity, and crystalline arrangement.
- These forms can coexist in equilibrium under specific temperature and pressure conditions.
- The therapeutic and pharmaceutical applications of Gandhaka are well-documented since the era of Charaka Samhita.
- With the development of Rasashastra, sulphur gained prominence and became a pivotal rasa dravya.
- It plays a vital role in both dehavada (body-related applications) and dhatuvada (metal transformation).
- Classical texts identify Gandhaka with terms like pamari and kusthari, emphasizing its therapeutic importance.
- The name sulbari highlights its utility in tamra marga, the process of copper incineration.

Synonyms

गन्धको गन्धपाषाणः गन्धी च रसगन्धकः।
सुगन्धिको गन्धिकश्च गन्धः सौगन्धिकस्तथा।।
पूतिगन्धोऽतिगन्धश्च पामारिः कीटनाशनः।
बलिर्बलिवसाख्यश्च कुष्ठारिः शरभूमिजः।।
शुल्बारिर्नवनीतश्च दैत्येन्द्रो गन्धमादनः।
कीटघ्नः क्रूरगन्धश्च स एव परिकीर्तितः।। (R.T. 8/1-3)

Gandhaka, Gandhapashana, Gandhi, Rasagandhaka, Sugandhika, Gandhaka, Gandha, Saugandhika, Putigandha, Atigandha, Pamari, Kitanashaka, Bali, Bali-Vasa, Kushthari, Sharabhumija, Shulbari, Navanita, Daityendra, Gandhamadana, Kitaghna and Kruragandha.

Mineralogical identification

Properties	Identification
Chemical Name	Sulphur
Chemical Composition	S
Colour	Yellow
Cleavage	None
Luster	Greasy
Streak	Yellow
Specific Gravity	2.08
Hardness	2.0
Fracture	Conchoidal
Transparency	Transparent

Sources

- Sulphur is often found in its natural form near volcanic regions.
- Large native sulphur deposits are located in Texas and Louisiana, making them significant sources in the United States.
- Key producers of sulphur worldwide include Canada, Japan, Poland, and the Russia.

Types

स चापि त्रिविधो देवि! शुकचञ्चुनिभो वरः।
मध्यमः पीतवर्णः स्याच्छुक्लवर्णोऽधमः स्मृतः।।
चतुर्धा गन्धको ज्ञेयो वर्णैः श्वेतादिभिः खलु।
श्वेतोऽत्र खटिका प्रोक्तो लेपने लोहमारणे।।
तथा चामलसारः स्याद्यो भवेत्पीतवर्णवान्।
शुकपिच्छः स एव स्याच्छ्रेष्ठो रसरसायने।।
रक्तश्च शुकतुण्डाख्यो धातुवादविधौ वरः।
दुर्लभः कृष्णवर्णश्च स जरामृत्युनाशनः।। (R.R.S. 3/12-15)

1. Shukachanchunibham
2. Pitta Varna
3. Shveta Varna

Other

1. Rakta Varna
2. Pitta Varna
3. Shveta Varna
4. Krishna Varna

Accordin g to Market Avaliability

1. Amalasara Gandhaka
2. Pinda Gandhaka

Grahya Lakshana

शुकपिच्छसमच्छायो नवनीतसमप्रभः।
मसृणः कठिनः स्निग्धः श्रेष्ठो गन्धक उच्यते।। (Ay.Pra. 2/20)

1. The ideal gandhaka is characterized by a yellowish-green hue, akin to the feathers of a parrot (shukapichchha).
2. It possesses a buttery softness, making it smooth to the touch despite its inherent hardness.
3. A distinct unctuous (snigdha) nature further distinguishes this variety as the finest quality of gandhaka.

Doshas

Ashuddha Gandaka Sevanajanya Dosha

अशुद्धगन्धः कुरुते च कुष्ठं तापं भ्रमं पित्तरुजं तथैव।
रूपं सुखं वीर्यबलं निहन्ति तस्माद्विशुद्धो विनियोजनीयः।।
(Ay.Pra. 2/18)

Kushtha, Jvara, Bhrama, Pitta Vikara, Rupa-Virya-Bala Nasha.

Treatment

विकारो यदि जायेत गन्धकाच्चेत्तदा पिबेत्।
गोघृतेनान्वितं क्षीरं सुखी स्यात् स च मानुषः।।
(Bri.R.R.Sun., p. 57)

Go-Ghrita with Milk

Shodhana

Method 01

गव्ये पयति गन्धं तु भृंगराजरसेऽथवा।
रसपर्पटिकाप्रोक्तविधानेन विशोधयेत्।। (R.Mr. 2/3)

1. Gandhaka is melted in an iron pan smeared with ghee and then poured into a pot containing godugdha or bhringaraja rasa.
2. Once cooled, it is collected, washed, dried, and then kept for use.
3. For the purpose of Rasa Parpati preparation, 3 or 7 Bhavanas of Bhringaraja are given to powdered Gandhaka.
4. The Gandhaka is then melted in a ghee-coated vessel and poured into Bhringaraja rasa.

Method 02

लोहपात्रे विनिक्षिप्य घृतमग्नौ प्रतापयेत्।
तप्ते घृते समानं तु क्षिपेद्गन्धकजं रजः।।
विदुतं गन्धकं ज्ञात्वा तनुवस्त्रे विनिक्षिपेत्।
यथा वस्त्राद्विनिःसृत्य दुग्धमध्येऽखिलं पतेत्।।
शीतो निष्कासितो धौतो जलं वस्त्रेण शोषयेत्।
एवं नैर्मल्यमापन्नो गन्धकः शुद्ध उच्यते।।
एवं वारत्रयं शोध्यो भिन्ने दुग्धे प्रयत्नतः।
भक्षणार्थं हि भिषजा योगार्थं सकृदेव च।। (Ay.Pra. 2/21-24)

1. Heat ghee in a wide iron vessel over a mild flame until melted.
2. Add equal powdered unpurified sulphur and stir until molten.
3. Pour molten sulphur through a thin cloth tied over a vessel containing warm cow's milk.
4. Solidified sulphur collects at the bottom.
5. Repeat the melting and filtration process three times.
6. Wash the sulphur with warm water to remove residues, dry, powder, and store in an airtight container as Shuddha gandhaka.

रक्तिकातः समारभ्य रक्तिकाष्टकसम्मितम्।
प्राणाचार्यः प्रयुञ्जीत गन्धकं तु विशोधितम्।। (R.T. 8/39)

Dose

1- 8 Ratti

Anuapana

Milk

Properties

गन्धाश्मातिरसायनः सुमधुरः पाके कटूष्णो मतः।
कण्डूकुष्ठविसर्पदद्रुदलनो दीप्तानलः पाचनः।।
आमोन्मोचनशोषणो विषहरः सूतेन्द्रवीर्यप्रदः।
गौरीपुष्पभवस्तथा कृमिहरः सत्त्वात्मकः सूतजित्।।
(R.R.S. 3/16)

- **Rasa**: Madhura
- **Guna**: Ushna, Sara, Snigdha
- **Virya**: Ushna
- **Vipaka**: Katu
- **Dosha**: Pittavatahara
- **Karma**: Dipana, Pachana, Balya, Rasayana, Viryaprada, Ayushakara.
- **Therapeutic Uses**: Kushtha, Kandu, Visarpa, Dadru, Amanashaka, Rasayana.

Probable Physico-Chemical Changes

During Shodhana of Gandhaka

a. Physical Changes

- Sulfur melts during heating and re-solidifies in purifying liquids.
- Solid impurities are filtered out.
- Becomes brighter (yellow/reddish-yellow).
- Gains a smooth, uniform texture.
- Dried after washing to ensure stability.

b. Chemical Changes

- Neutralization of toxins via ghee, milk, or Bhringaraja rasa.
- Organic and inorganic contaminants are removed.
- Heating and cooling stabilize sulfur's structure.
- Reactions with purifying agents improve safety and bioavailability.

Importance of Temperature while Processing

- Sulphur melts at around 115°C. Heating must be gentle to avoid overheating, which can lead to the formation of toxic fumes (sulphur dioxide) or undesired chemical reactions.
- Ghee, used as the heating medium, has a high smoke point (~250°C), but care must be taken to ensure it doesn't overheat and degrade, which could affect the purification process.
- Proper temperature ensures the sulphur remains in a molten state for smooth filtration through the cloth into the milk. If the temperature is too low, sulphur may solidify prematurely; if too high, it may damage the filtration medium.
- Milk should be warm enough (~40–50°C) to facilitate the filtration process and promote the desired reaction but not so hot that it causes rapid cooling or denatures essential properties that aid in the purification.
- Maintaining optimal heat during washing helps in effectively dissolving and removing impurities without recontaminating the purified sulphur.
- Consistent temperature control across cycles ensures uniformity and reproducibility of the final product's quality.
- In summary, precise temperature regulation safeguards the chemical integrity of sulphur, supports the filtering medium, and enhances the purity and efficacy of the final preparation.

Yoga

1. Gandhaka rasayana
2. Gandhakadya malahara
3. Rasaparpati
4. Panchamrita parpati
5. Rasasindura

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Classical Review of Gandhaka (Sulphur)-An Ayurvedic Perspective	Ajay Singh PG Scholar, Department of Rasa-śāstra and Bhaisajya Kalpana, Patanjali Bhartiya Ayurvigyan Evum Anusandhan Sansthan, Haridwar, Uttarakhand, India	Gandhaka (sulfur) is essential for the body, being the third most abundant mineral by weight and the sixth most common macro-mineral in breast milk. It is found in saliva, bile, proteins, and amino acids, mainly in cystine. Gandhaka purifies blood, aids digestion, and prevents toxin buildup. As an important Uparasa, it ranks just below Parada in Rasa-shastra. Known for its rejuvenating properties, it is used in treatments for skin infections, with key formulations like Gandhaka Druti, Gandhak-Rasayana, and Simhanada Guggulu.
2.	A critical study of Gandhaka Shodhana	Manisha Rathi, Professor & HOD, Dept. of Rasa Shastra & Bhaishajya Kalpana, Mansarovar Ayurvedic Medical College Hospital & Research Center, Bhopal, Madhya Pradesh, India	This article discusses the purification of Gandhaka (sulfur) using Swedana (sweating) to transfer therapeutic properties. The process involves diffusion and osmosis, making the drug biocompatible. Ghee and Milk remove fat-soluble and water-soluble toxins, respectively. Vastragalana filters physical impurities, while Bhavana and Mardana enhance potency. Sublimated Gandhaka (Flower of Sulphur) is used in treating skin conditions like acne, rashes, and fungal infections.
3.	Applied Aspect of Gandhaka Shodhana And Its Importance	Dr. Monika Kashyap, P.G. Scholar Dept. of Ras Shastra & Bheshijya Kalpna At Rani Dullaiya Smt. Ayurved P.G. College and Hospital, Bhopal, MP.	This study focuses on the practical applications of Suddha Gandhaka. 1. Pama: Purified sulfur, when applied externally, helps alleviate chronic skin conditions by mixin g with other substances. 2. Twak Roga: All skin disorders can be cured by taking purified sulfur with coconut oil for 7 days. 3. Drishtimandya: Purified sulfur, when taken with Triphala Churna, Goghrita, Bhringaraja Svarasa, and honey, enhances vision and promotes longevity. 4. Kasa: Taking sulfur with Vasa Kashaya helps relieve coughing.

Gairika (Red Ochre)

Introduction

- Gairika, the second mineral drug in the uparasa group, is identified as Haematite or Ochre.
- Haematite is a mineral form of iron oxide (Fe_2O_3), one of several iron oxides.
- It exhibits colors ranging from black to steel-grey, silver-grey, brown, reddish-brown, and red.
- All forms share a characteristic rust-red streak.
- Common varieties include kidney ore, martite (pseudomorphs after magnetite), iron rose, and specularite (specular hematite).
- Haematite is harder than pure iron but significantly more brittle.
- Massive deposits are found in banded iron formations.
- Grey haematite is commonly located in areas with standing water or hot springs, such as Yellowstone National Park, USA.
- It can precipitate from water and settle in layers at the bottom of lakes or springs.
- Haematite may also form without water, typically due to volcanic activity.
- Haematite has been in therapeutic use since the Charaka Samhita period.
- It is prominently mentioned in Rasashastra texts as part of the uparasa group and is a primary ore of iron.

Synonyms

गैरिकं त्वथ गैरेयं गिरिभृद् गिरिमृत्तिका।
रक्तधातुर्लोहधातुस्तदेव गिरिमृद्भवम्।। (R.T. 22/110)

Gaireya, Giribhnid, Girimrittika, Raktadhatu, Lohadhatu and Girimridbhava.

Mineralogical identification

Properties	Identification
Chemical Name	Red Ochre
Colour	Red Brown
Cleavage	None
Luster	Metallic
Streak	Reddish Brown
Specific Gravity	4.8 – 5.2
Hardness	5.5 to 6
Fracture	Uneven
Transparency	Opaque

Sources

This mineral is widely distributed across India, with Bihar being particularly renowned for its rich mines.

Types

गैरिकं तु समाख्यातं द्विविधं रसकोविदैः।
पाषाणगैरिकं त्वाद्यं द्वितीयं स्वर्णगैरिकम्।। (R.T. 22/111)

1. Pashana Gairika (Ruksha, kathina with tamra varna)
2. Svarna Gairika (Snigdha, masrina with sonita varna)

पाषाणगैरिकं चैकं द्वितीयं स्वर्णगैरिकम्।
पाषाणगैरिकं प्रोक्तं कठिनं ताम्रवर्णकम्।।
अत्यन्तशोणितं स्निग्धं मसृणं स्वर्णगैरिकम्। (R.R.S. 3/46-47)
द्विविधं गैरिकं प्राहुः स्वर्णं सामान्यगैरिकम्।
परैस्तृतीयमाप्युक्तं पाषाणाख्यं हि गैरिकम्।।
गैरिकं त्रिविधं रक्तहेमकेवलभेदतः।। (Ay.Pra. 2/268-269)

1. Svarna gairika
2. Samanya gairika
3. Pashana gairika

गैरिकं त्रिविधं रक्तहेमकेवलभेदतः।। (Rasanv.T. 7/83)

1. Rakta gairika
2. Hema gairika
3. Kevala gairika

Grahya Lakshana

सुवर्णगैरिकं स्निग्धं मसृणं त्वतिकोमलम्।
पाषाणगैरिकं रूक्षं कठिनं नातिलोहितम्।।
पाषाणगैरिकात् श्रेष्ठं कथितं स्वर्णगैरिकम्।
अतः सर्वत्र मतिमान् योजयेत्स्वर्णगैरिकम्।। (R.T. 22/112-113)

a. Svarna Gairika

- Characterized by its softness, smoothness (masrin), and unctuous nature (snigdha).
- Preferred for its superior qualities in pharmaceutical and therapeutic applications.

b. Pashna Gairika

- Exhibits a rough (rukshya), hard (kathina) texture with a pale red hue.
- Considered less desirable compared to svarna gairika.

Comparison and Preference

Svarna gairika is regarded as Shreshtha (superior) over Pashana gairika.

Shodhana

Method 01

गैरिकं तु गवां दुग्धैर्भावितं शुद्धिमृच्छति।। (R.R.S. 3/49)

1. Take Gairika and powder it using a Khalva.
2. Add godugdha and perform the Bhavana procedure three times.
3. Collect the Shuddha Gairika and store in air tight container.

Method 02

गव्याज्येन तु संभृष्टं यत्नतो मन्दवह्निना।
सुवर्णगैरिकं शीघ्रं शुद्धिमाप्नोत्यसंशयम्।। (R.T. 22/115)

1. Take fine powder of svarna gairika and place it in a clean iron vessel (kadhahi).
2. Heat the vessel over a mild flame.
3. Add the required quantity of ghee to the powder and fry thoroughly.
4. Allow the mixture to dry, yielding purified gairika (shuddha gairika).
5. Store the dried powder in an appropriate container for future pharmaceutical use.

Dose

द्विगुञ्जतः समारभ्य चतुर्गुञ्जमितं परम्।
सुवर्णगैरिकं शुद्धं युञ्जीत भिषजां वरः।। (R.T. 22/119)
Dose: 2 - 4 ratti (250 mgs - 500 mgs)

Properties

सुवर्णगैरिकं स्निग्धं मधुरं शिशिरं परम्।
तुवरं तापहरणं हिक्कावमिनिवारणम्।।
रक्तपित्तप्रशमनं तथासृग्दरनाशनम्।
विषापहं तथा बल्यं मतं लोचनयोर्हितम्।।
उदर्दकण्डूशमनं तथैव व्रणरोपणम्।
ज्वरघ्नं च विशेषेण वह्निदाहनिबर्हणम्।। (R.T. 22/116-118)

- **Rasa**: Madhura, Kashaya
- **Guna**: Snigdha
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Pittahara
- **Karma**: Netrya, Dahara, Balya, Vranaropana
- **Therapeutic Uses**: Raktapitta, Hikka, Vamana, Visha, Kandu, Shitapitta.

Probable Physico-Chemical Changes

During the Shodhana Process

a. Physical Changes

- Fine powdering increases surface area.
- Smoother texture and brighter, uniform hue.
- Volatile and soluble impurities are eliminated.
- Even mixing with purifying agents ensures consistency.

b. Chemical Changes

- Removal or neutralization of toxic elements.
- Enhanced stability and shelf life.
- Interaction with milk or ghee introduces therapeutic compounds.
- Stabilizes mineral composition.

Importance of Temperature while Processing

- Ensures effective elimination of volatile and soluble impurities.
- Prevents degradation of Gairika and purifying agents like milk or ghee.
- Facilitates thorough mixing and absorption of therapeutic compounds.
- Maintains mineral composition and prevents over-oxidation.
- Ensures consistent purification across the batch.
- Aids drying, enhancing shelf life and preventing contamination.
- Proper temperature ensures safe, effective purification and therapeutic potency.

Yoga

1. Pusyanuga chusrna
2. Pradarantaka louha
3. Irimedadi taila
4. Jatyadi taila
5. Gairikadya malahara

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Critical Review on Gairikam	Lekshmipriya S., Assistant Professor, Department of Rasashastra & Bhaishajya Kalpana, Parul Institute of Ayurved, Parul University, Limda, Vadodara, Gujarat, India	This article aims to compile all available information about Gairika as described in classical Rasashastra texts, emphasizing that it should contain no less than 16% Fe or 21% Fe_2O_3.

Sr.No.	Article Name	Author Name	Result
2.	An analytical study of Gairika by two different methods of shodhana	Manjiri Ranade Department of Rasa shastra and BK Institute Name Sri Sai Ayurvedic Medical College, Aligarh, Uttar Pradesh	The Shodhana of Gairika was carried out using two methods: Method A with Godugdha and Method B with Goghruta. The organoleptic and physicochemical properties of Gairika were analyzed before and after the Shodhana processes. Additionally, ICP-AES was performed on three samples of Gairika. Results: Significant changes were observed in parameters such as pH, Mohs hardness, specific gravity, and transparency after Shodhana with both Godugdha and Goghruta. ICP-AES analysis confirmed that the mineral content remained within permissible limits. Both Godugdha and Goghruta effectively facilitate the Shodhana of Gairika, with ICP-AES data indicating trace metal levels within safe limits, ensuring minimal toxicity.

Kankshi (Alum)

Introduction

- Sphatika is the third mineral drug in the uparasa group.
- It is commonly known as potash alum in English.
- Potassium alum crystallizes into regular octahedra with flattened corners.
- It is highly soluble in water and exhibits astringent properties.
- Its solution turns litmus paper red, indicating acidity.
- When heated to nearly red-hot temperatures, it forms a porous, friable substance called "burnt alum."
- It melts at 92°C using its own water of crystallization.
- Neutral alum is produced by adding sodium carbonate to an alum solution until alumina begins to separate.
- Used as a mordant in dyeing and the preparation of lakes for hand-made paper sizing.
- Helps in clarifying turbid liquids by precipitating impurities.
- Sphatika has been utilized in therapeutic practices since the Charaka Samhita period.
- It is classified under the uparasa group in Rasashastra texts.
- Widely incorporated in compound formulations of Ayurveda for its medicinal properties.

Synonyms

स्फटिकारि: स्फुटि चैव स्फटिका स्फुटिकारिका।
स्फुटिका फटिका चैव शुभ्रा कांक्षी च रङ्गदा।।
दृढरङ्गा रङ्गदृढा तथैव दृढरङ्गदा।
तुवरी रङ्गदात्री च कथिता भिषां वरै:।। (R.T. 11/178-179)

Sphatikari, Sphuti, Sphatika, Sphutikarika, Sphutika, Phatika, Subhra, Kankshi, Rangada, Dridharanga, Rangadridha, Dridharangada, Tuvari and Rangadatri.

Mineralogical Identification

Properties	Identification
Chemical Name	Alum
Colour	Colourless
Cleavage	Perfect
Luster	Vitreous
Streak	White
Specific Gravity	2.6 – 2.75
Hardness	3.5 – 4
Fracture	Conchoidal
Transparency	Translucent

Sources

In India the mineral is found in Shaurashtra (Gujarat), Punjab, Bihar, Goa, Uttar Pradesh and Nepal. It is also artificially prepared. Overseas, the ores are found in Italy, United States and in the island of Cebu. Here it is locally known as tavas.

Types and Grahyata

फटकी फुल्लिका चेति द्वितीया परिकीर्त्तिता।।
ईषत्पीता गुरु: स्निग्धा पीतिका विषनाशिनी।
व्रणकुष्ठहरा सर्वकुष्ठघ्नी च विशेषत:।।
निर्भारा शुभ्रवर्णा च स्निग्धा साम्लाऽपरा मता।
सा फुल्ल तुवरी प्रोक्ता लेपात्ताम्रं चरेदियम्:।।

(R.R.S. 3/60-62)

2 types of Sphatika

a. Phalaki

- Light yellow in colour.
- Heavy and soft in texture.
- Effective in neutralizing the effects of poisons on the body.
- Aids in wound healing.
- Recommended for all types of kushtha roga.

b. Phullika

- Light in weight.
- Bright white in colour.
- Smooth in texture with a slightly sour taste.
- Its paste, when applied to copper foils, facilitates the incineration of copper.

Shodhana

Method 01

काशीशं भृंगनीरेण त्रिवारं भावितं शुचि।। (Rasa.Mr. 3/158)

1. Take Kankshi and powder it using a Khalva.
2. Add Bhringraja rasa and perform the Bhavana procedure three times.
3. Collect the Shuddha Kankshi and store in air tight container.

Method 02

तुवरी काञ्जिके क्षिप्त्वा त्रिदिनाच्छुद्धिमृच्छति। (R.R.S. 3/64)

1. Obtain ashuddha sphatika and a sufficient amount of kanji (fermented sour liquid).
2. Place the ashuddha sphatika in a container filled with kanji.
3. Ensure the sphatika is fully submerged.
4. Allow the sphatika to remain immersed in kanji for a period of three days.
5. On the fourth day, remove the sphatika from the kanji.
6. Rinse it briefly if needed and let it dry completely under suitable conditions.
7. Once dried, the sphatika is ready for use as shuddha sphatika (purified form).

Marana

वह्नौ प्रोत्फुल्लयेत् किं वा सम्यग् लघुपुटे पचेत्।
कुन्दवज्जायते भस्म सर्वरोगेषु योजयेत्।।

(Parad Samhita, Rasashastra, C.B.Jha, p. 256)

1. Take purified shuddha sphatika.
2. Place the shuddha sphatika inside a sharava samputa (a sealed clay container).
3. Ensure the container is properly sealed to avoid contamination or loss of material.
4. Subject the enclosed sharava samputa to one laghu puta (a mild heating process).
5. After heating, allow the setup to cool naturally to room temperature.
6. Open the sharava samputa carefully to collect the resulting white-coloured sphatika bhasma.
7. The prepared bhasma is now ready for use in various therapeutic applications.

Dose

2- 4 Ratti

Anupana

Sugar, Jala

Properties

कांक्षी कषाया कटुका च तिक्ता ख्याता तथोष्णा विषदोषहन्त्री।
विसर्पकण्डूतिहरा च केश्या श्वित्रापहा वै व्रणरोपणा च।।
नेत्ररोगप्रशमनी विषमज्वरनाशिनी।
रतिमन्दिरसङ्कोचकारिणी व्रणहारिणी।।
ग्राहिणी लेखनी स्निग्धा रुधिरनावरोधिनी।
मुखरोगहरा चैव दन्तदार्ढ्यकरी मता।। (R.T. 11/181-183)

- **Rasa**: Kashaya, Katu, Tikta
- **Guna**: Guru, Snigdha
- **Virya**: Ushna
- **Vipaka**: Katu
- **Dosha**: Tridoshahara
- **Karma**: Keshya, Kantaya, Netrahita, Vranashodhini, Mukharogahara
- **Therapeutic Uses**: Kantha Roga, Keshya, Vishagana, Shvitra, Kushtha, Tridoshashamaka.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Fine powdering increases surface area for purification.
- Becomes smoother and more homogenous.
- May exhibit a brighter, uniform color after removal of impurities.
- Physical separation of dirt, earthy materials, and unwanted residues.

b. Chemical Changes

- Interaction with Bhringaraja rasa or kanji neutralizes toxins and removes water-soluble impurities.
- Fermented kanji facilitates minor chemical reactions that enhance purity.
- Absorption of beneficial compounds from purifying agents like Bhrigaraja rasa.

During Marana Process

a. Physical Changes

- Sphatika (crystals) converts into fine, white ash (bhasma).
- Becomes soft, powdery, and highly bioavailable.
- Loss of moisture and volatile components.

b. Chemical Changes

- Heating promotes oxidation of metallic or mineral impurities, enhancing stability.
- Crystal lattice of sphatika breaks down, forming a stable, bioavailable compound.
- Volatile or harmful substances are eliminated during heating.

Importance of Temperature while Processing

- Ensures efficient detoxification.
- Protects therapeutic properties of materials and purifying agents.
- Supports beneficial chemical transformations.
- Ensures consistent quality and efficacy.
- Avoids degradation or loss of active components.

Yoga

1. Eladi mantha
2. Shankhadravaka rasa
3. Chatuhshuddha rasa
4. Nayanasonanjana
5. Garudanjana

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Kankshi- An Overview	A. Laxmikanthi, M.D. Scholar, P.G. Department of Rasashastra and Bhaishajya Kalpana, Dr. N. R. S. Government Ayurvedic College, Vijayawada, Andhra Pradesh, India	Kankshi is a readily available mineral, commonly used in water treatment and the dyeing industry. When purified, it is combined with other herbs to treat various ailments and is known as Amayika prayoga. Notably, Kankshi does not require Marana and can be used directly after Shodhana in the form of Shubhra Bhasma obtained via Nirjalikarana. It is a key ingredient in the well-known formulation Netra Bindu, which combines Kankshi (1 part) with rose water (16 parts). Despite limited research on Kankshi, its potential for further study is vast and promising.
2.	Assessment of efficacy of Kankshi Bhasma Dhantadhavana in extrinsic dental stain an observational study	Manjula Turamari, Assistant Professor, SNVV'S SGV Ayurvedic Medical College, Hospital and Research Centre, Bailhongal, Karnataka, India	Chewing tobacco increases dental caries and tooth loss, with users having 67% more tooth loss than non-users. The sweeteners and flavoring agents in tobacco products contribute to decay. Kankshi Bhasma Dantadhavana, containing Potash alum, offers antiseptic, antibacterial, and healing properties, making it an effective Ayurvedic remedy for dental issues like staining, plaque, and sensitivity caused by tobacco use.
3.	Efficacy of "Kankshi Jal Gandush" in Post Tonsillectomy Wound Healing.	Dr. P.P. Jagtap, Asst. Prof. Dept. of Shalakyatantra, Dr D .Y. Patil College of Ayurved and Research Center, Pimpri, Pune 411018, M.S. India.	The study concluded that tonsillitis is most common in the age group of 6-16 years. Kankshi Jal Gandush was found to be highly effective in promoting faster and healthier wound healing post-tonsillectomy, with reduced pain and no complications. Patients in the trial group experienced faster recovery in speech and swallowing compared to the control group. Systemic treatment with Sookshama Triphala and Gandhaka Rasayana further supported quicker recovery. Kankshi is affordable, easily available, and ideal for post-operative tonsillectomy care, offering benefits like pain relief, reduced infection, and improved swallowing. These encouraging results suggest that Kankshi Jal should be routinely used in post-operative tonsillectomy care for safe and faster recovery.

Haratala (Orpiment)

Introduction

- Haratala is classified as the fifth mineral drug in the uparasa group.
- It is known as orpiment or yellow arsenic in English.
- Insoluble in water and has a brittle nature.
- On heating, it burns and emits sulphur dioxide and arsenic oxide gases.

- Arsenic, in all its forms, is highly toxic.
- Arsenic levels in food are typically low, as it is not intentionally added due to its toxicity.
- Fish and seafood may have higher arsenic levels since they absorb it from water.
- Fortunately, most of this is in the less harmful organic form of arsenic.
- However, fish containing significant levels of inorganic arsenic can pose health risks.
- Haratala has been in therapeutic use since the Charaka Samhita period.
- Extensively detailed in texts of Rasashastra, it is listed under the uparasa group.

Synonyms

हरितालं मतं तालं तालकं नटभूषणम्।
नटमण्डनकञ्चापि मतं शैलूषभूषणम्।।
विडालकं चित्रगन्धं पिञ्जरं वंशपत्रकम्।
आलं पीतनकञ्चापि कथितं मल्लगन्धजम्।।
तालकं जायते यस्मान्मल्लगन्धकमिश्रणात्।
तस्माद्भिषग्वरैरेतन्मल्लगन्धजमुच्यते।। (R.T. 11/1-3)

Haritala, Tala, Talaka, Nata-bhushana, Nata-Mandana, Shailusha-bhushana, Vidalaka, Chitra-gandhaka, Pinjara, Vamsa-Patraka, Ala, Pitanaka and Malla-Gandhaka.

Mineralogical Identification

Properties	Identification
Chemical Name	Arsenic Trisulphide
Chemical Composition	As_2S_3
Colour	Lemon Yellow to Golden
Cleavage	Perfect
Luster	Resinous
Streak	Pale Yellow
Specific Gravity	3.49
Hardness	1.5 – 2
Fracture	Sectile
Tenacity	Sectile

Sources

1. Arsenic occurs naturally in small amounts as microcrystalline masses.
2. These masses are found in regions such as Siberia, Germany, France, Italy, Romania, and the United
3. The majority of arsenic is found combined with sulphur in various minerals.
4. Common Arsenic-Containing Minerals:
   - •Arsenopyrite
   - •Orpiment
   - •Realgar
   - •Enargite

Types

तालकं द्विविधं ख्यातं रससिद्धैः पुरातनैः।
प्रथमं पत्रतालं स्याद् द्वितीयं पिण्डतालकम्।। (R.T. 11/4)

1. Patra Haratala

सुवर्णवर्णं विमलं गुरुं चापि महोज्ज्वलम्।
तनुपत्राचितं स्निग्धं मतं तत्पत्रतालकम्।। (R.T. 11/5)

1. Exhibits a golden hue (suvarna varna).
2. Free from impurities (vimala).
3. Dense and heavy (guru).
4. Highly lustrous (mahojjvala).
5. Composed of noticeably thin layers (tanu-patra).
6. Feels soft (snigdha) to the touch.

2. Pinda Haratala

निष्प्रभं स्वल्पसत्त्वञ्च पत्रहीनं तथा लघु ।
विशेषतः पिण्डरूपं स्मृतं तत्पिण्डतालकम्।। (R.T. 11/6)

1. Lacks luster (nishprabha).
2. Contains little to no sattva (essence).
3. Does not have layers and appears as a single mass (pinda).
4. Light in weight and not dense.

Grahya Lakshana

पत्रतालं त्रिदोषघ्नं कुष्ठरोगहरं परम्।
वातरक्तप्रशमनं परमेतद्रसायनम्।।
पिण्डतालं समाख्यातं भृशं स्त्रीपुष्पहारकम्।
पत्रतालात्स्वल्पगुणं विशेषाद्धेयमेव तत्।। (R.T. 11/7-8)

Patra Haratala

- Balances all three doshas (tridosha-shamaka).
- Effective in treating skin disorders (kushtha roga) and gouty arthritis (vatarakta).
- Serves as an excellent rejuvenator (rasayana).
- Classified as the grahya (acceptable) variety for medicinal applications.

Pinda Haratala

- Can lead to cessation of menstrual flow if used.
- Contains minimal or no medicinal properties.
- Deemed unsuitable for therapeutic purposes.

Doshas

अशुद्धं तालमायुर्घ्नं कफमारुतमेहकृत्।
तापस्फोटाङ्गसंकोचं कुरुते तेन शोधयेत्।। (R.R.S. 3/69)

1. Kapha and vata rogas (Disorders of Vata and Kapha doshas).
2. Prameha (Diabetes and other urinary disorders).
3. Tapa (Increase in body temperature).
4. Sphota (Blisters over skin).
5. Angasankocha (Contraction of body organs and muscles).

Shodhana

Method 01

स्विन्नं कूष्माण्डतोये वा तिलक्षारजलेऽपि वा।
तोये वा चूर्णसंयुक्ते दोलायन्त्रेण शुद्ध्यति।। (R.R.S. 3/70)

1. Roughly pound the patra haratala until it reaches a coarse consistency.
2. Place the pounded haratala into a cloth bag (pottali) and securely tie it.
3. Set up the dolayantra apparatus.
4. Add one of the following liquid media to the dolayantra:
   - Kushmanda svarasa (juice of Benincasa hispida),
   - Tilakshara jala (alkaline solution made from sesame ash),
   - Churnodaka (lime water).
5. Suspend the pottali containing haratala in the dolayantra, ensuring it is fully immersed in the liquid medium.
6. Perform svedana (steam heating) for a continuous duration of 3 hours (equivalent to one yama).
7. After heating, remove the pottali and carefully dry the haratala.
8. Once completely dried, transfer the purified haratala (shuddha haratala) into an airtight container for storage.
9. This process ensures the purification and preparation of shuddha haratala, ready for medicinal or alchemical use.

Method 02

चूर्णीकृतं पत्रतालं चूर्णनीरेण भावयेत्।
सप्तवारं प्रयत्नेन शुद्धिमायात्यनुत्तमाम्।। (R.T. 11/25)

1. Finely grind the patra haratala into a powder.
2. Mix the haratala powder with churnodaka (lime water) to form a paste.
3. Dry the paste completely.
4. Repeat this process seven times (7 bhavanas).
5. Dry thoroughly and store the purified haratala in an airtight container.

Marana

मधुतुल्ये घनीभूते कषाये ब्रह्ममूलजे।
त्रिवारं तालकं भाव्यं पिष्ट्वा मूत्रेऽथ माहिषे।।
उपलैर्दशभिर्देयं पुटं रुद्ध्वाऽथ पेषयेत्।
एवं द्वादशधा पाच्यं शुद्धं योगेषु योजयेत्।। (R.R.S. 3/74-75)

1. Take shuddha haratala and finely triturate it in a clean khalva yantra (mortar and pestle) to obtain a fine powder.
2. Mix the haratala powder with a thick decoction of palashamula tvak (bark of Butea monosperma root).
3. Perform three bhavanas, allowing the paste to dry completely after each cycle.
4. Triturate the haratala powder with buffalo's milk to form a paste.
5. Shape the paste into pellets (chakrikas) of the desired size and thickness.
6. Dry the pellets under the sun.
7. Place the dried pellets in a sharava samputa (earthen vessel) and cover it.
8. Heat the samputa using 10 dry cow dung cakes (laghu puta).
9. Perform the heating process 12 times, repeating the drying and heating steps for each cycle.
10. Store the prepared haratala bhasma in an airtight container for therapeutic use.

Dose

पादांशतो रक्तिकायाः रक्तिकार्द्धमितं परम्।
विमलं च मृतं तालं प्रयुञ्जीत भिषग्वरः।। (R.T. 11/56)

1/4th – ½ ratti (31 mgs - 62 mgs)

Properties

हरितालं कटु स्निग्धं कषायोष्णं हरेद्विषम्।
कण्डूकुष्ठादिरोगास्रकफपित्तकचव्रणान्।। (Ay.Pra. 2/176)

- **Rasa**: Katu, Kashaya
- **Guna**: Snigdha, Ushna
- **Virya**: Ushna
- **Vipaka**: Katu
- **Dosha**: Kapha Vatahara
- **Karma**: Balakara, Medhya, Rasayana, Pushtikara, Vishaghana.
- **Therapeutic Indications**: Kandu, Kushtha, Rakta-pitta and Vrana.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Haratala is pounded and powdered, increasing surface area for interaction.
- Insoluble impurities are removed through filtration and steaming in dolayantra or repeated Bhavana (triturations).
- Becomes finer, smoother, and more homogeneous.
- May turn brighter or uniform due to removal of impurities.
- Drying after each step eliminates excess liquid.

b. Chemical Changes

- Toxic elements, such as arsenic compounds in raw Haratala, are neutralized or converted into safer forms.
- Alkaline solutions (lime water, sesame ash water) and steaming facilitate reactions that stabilize the material.
- Beneficial compounds from media like kushmanda svarasa or churnodaka are absorbed into Haratala.
- Soluble impurities dissolve and are removed during Bhavana and svedana (heating).

During Marana Process

a. Physical Changes

- Haratala transitions from crystalline form to fine, soft bhasma (ash).
- The material is shaped into uniform pellets (chakrikas) for controlled processing.
- Loss of moisture, volatile compounds, and impurities through repeated heating cycles.
- Becomes light, fine, and bioavailable.

b. Chemical Changes

- Arsenic trisulphide (Haratala) undergoes oxidation or reduction, transforming into stable, non-toxic compounds.
- Organic materials (e.g., palasha mula kashaya and buffalo milk) decompose, aiding in detoxification and imparting medicinal properties.
- Heating converts Haratala into a chemically inert, stable, and safe form.
- Interaction with alkaline and organic substances during heating leads to the formation of therapeutic compounds.

Importance of Temperature while Processing

1. During Shodhana Process

- Ensures efficient detoxification by facilitating reactions between Haratala and the liquid medium.
- Prevents degradation or incomplete purification through controlled heating.

2. Marana (Incineration)

- Enables complete transformation of Haratala into safe, bioavailable bhasma.
- Enhances therapeutic properties via repeated heating cycles.
- Regulates sublimation and prevents loss of material.
- Facilitates absorption of medicinal adjuvants during bhavana.

Yoga

1. Talakeshvara rasa
2. Kasturibhairava rasa
3. Talasindura
4. Samirapannaga rasa
5. Rasamanikya
6. Vatagajankusha rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Ayurvedic Review of Haratala (Arsenic Trisulphide – As2s3) And Its Therapeutic Importance	Binu Alappat A, Ph.D. Scholar, Dept. of Rasasastra & Bhaishajya Kalpana, Gopabhandu Ayurveda Maha Vidyalaya, Puri, Odisha, India.	Haratala and its formulations are utilized for treating various diseases both externally and internally. Ayurvedic guidelines support its antifungal, antibacterial, and antimicrobial properties, which have been validated through numerous studies. However, its remarkable internal medicinal effects remain unpredictable and warrant further research. Investigating its potential for treating infections and chronic diseases could offer promising solutions for improving global health and quality of life.
2.	Pharmaceutical study of haratala w.s.r. to its various shodhana procedures – A Research Article	Bandeppa Sangolgi, N.K.Jabshetty Ayurvedic Medical College & P.G.Center, Bidar.	This study aims to establish a Standard Operating Procedure (S.O.P) for the Shodhana of Ashuddha Patra Haratala using Kushmanda Svarasa, Tila Kshara Jala, and Churnodaka, analyzing their effects on Haratala's properties. Shodhana is essential in Ayurveda for purifying substances and enhancing their medicinal properties, making them safe and bio-assimilable. The first written reference to Shodhana is found in Anand Kandam.
3.	Preliminary Physico–Chemical Evaluation of Haratala Bhasma	Pranav K. Shah, M.D. (Scholar), Department of R.S. & B.K., J.S. Ayurveda College, College Road, Nadiad M.S.	The three experimental groups were prepared and compared based on phytochemical analysis as well as advanced parameters such as heavy metal analysis, particle size analysis, microbial load, SEM, XRD, etc., which demonstrate the Standard Manufacturing Process (SMP) of Haratala Bhasma. The organoleptic properties of Haratala Bhasma showed positive results according to classical standards. Microbial load analysis of the prepared sample indicated the absence of microbial hazards. Based on all the evidence, clinical use in gout patients showed significant results.

Manahshila (Realgar)

Introduction

1. Manahshila is classified as the sixth mineral drug in the uparasa group in Ayurvedic medicine.
2. Known as "realgar" in English, it is a reddish-brown mineral.
3. Chemically, it is arsenic disulfide with the formula As_2S_2.
4. When heated to high temperatures, Manahshila releases sulfur dioxide (SO_2) and arsenic trioxide (As_2O_2) as major byproducts.
5. It has been in therapeutic use since the Charaka Samhita era, highlighting its ancient medicinal value.
6. Described extensively in Rasashastra texts, where it is prominently categorized under the uparasa group.
7. Manahshila is a key ingredient in several Ayurvedic formulations, showcasing its importance in traditional medicine.

Synonyms

मनःशिला रोगशिला शिला नैपालिका तथा।
मनोगुप्ता मनोज्ञा च मनोह्वा नागजिह्विका।।
कुनटी कुलटी गोला नागमाता च सा मता।
कल्याणिका च सैवेह कथिता रसनेत्रिका।। (R.T. 11/104-105)

Manahshila, Rogashila, Shila, Naipalika, Manogupta, Manojna, Manohva, Nagajihvika, Kunati, Kulati, Gola, Nagamata, Kalyanika and Rasanetrika.

Mineralogical identification

Properties	Identification
Chemical Name	Arsenic Disulphide
Chemical Composition	As_2S_2
Colour	Orange to red
Cleavage	Good
Luster	Sub Metallic
Streak	Orange yellow
Specific Gravity	3.5 – 3.6
Hardness	1.5 – 2
Fracture	Subconchoidal
Transparency	Transparent

Sources

- Realgar often occurs alongside orpiment (haratala) and is rarely found in a pure form.
- Typically found in combination with sulfur, oxygen, or various metals such as cobalt, copper, iron, nickel, silver, and tin.

- Major sources include regions in southern China, Spain, Myanmar (Burma), Switzerland, Japan, the USA, Iran, and India.
- In India, it is specifically found in Munsiyari, located in the Kumaon region of Uttarakhand.
- Realgar forms as deposits in hot springs and as volcanic sublimates.
- It commonly appears in mineral veins, often occurring as nests or nodules in clay, or in association with cinnabar.
- Found in veins within mines, contributing to its presence in various geological environments.

Types

मनःशिला त्रिधा प्रोक्ता श्यामाङ्गी कणवीरका।
खण्डाख्या चेति तदूपं विविच्य परिकथ्यते।।
श्यामा रक्ता सगौरा च भाराढ्या श्यामिका मता।
तेजस्विनी च निर्गौरा ताम्राभा कणवीरका।।
चूर्णीभूताऽतिरक्ताङ्गी सभारा खण्डपूर्विका।
उत्तरोत्तरतः श्रेष्ठा भूरिसत्त्वा प्रकीर्त्तिताः। (R.R.S. 3/88-90)
श्यामा हिङ्गुलवद् रक्ता किञ्चित्पीताऽतिदीप्तिका।
कणवीरा रक्तवर्णा चूर्णरूपाऽतिभारयुक्।।
किञ्चिद्रक्ता च गौरा च द्विखण्डा भारवत्तरा।
त्रिविधासु च श्रेष्ठा स्यात् कणवीरमनःशिला।।
(Ay.Pra. 2/216-217)

Sr. No.	Type	Charaterstics	Quality
1.	Syamangi	Reddish	Uttama
2.	Kanaviraka	Reddish with Lustrous copper, Heavy **Ayu. Pra.**- Powder Form	Madhyama
3.	Khandakya	Deep red colour, Heavy, Brittle **Ayu. Pra.**- Pale Red Colour	Adhama

रक्ता पीता तु खण्डाख्या पूर्वपूर्वा स्मृतोत्तमा।। (R.Kam.Dhe.)

1. Rakta (Shrestha)
2. Pita (Madhyama)
3. Khandakhya (Adhama)

Grahya Lakshana

मनःशिला शिलाखण्डशून्य रक्तोत्पलप्रभा।
भारे गुरुतरा दीप्ता शोधनार्हा मता बुधैः।। (R.T. 11/106)

- Selected Manahshila should be devoid of physical impurities such as mud, gravel, or foreign particles.
- It should exhibit a vibrant radiance similar to that of a rakta-kamala (red lotus).
- The ideal sample is notably heavy, indicating its quality and authenticity.
- A bright, lustrous appearance is essential, reflecting its high purity and potency.
- Only Manahshila meeting these criteria is chosen for purification, ensuring its effectiveness in pharmaceutical and therapeutic applications.

Doshas

अश्मरीं मूत्रकृच्छ्रं च अशुद्धा कुरुते शिला।
मन्दाग्निं मलबन्धं च शुद्धा सर्वरुजापहा।। (R.R.S. 3/92)

When Manahshila used internally without proper purification it leads to many doshas like:

1. Ashmari (Renal stone)
2. Mutrakrichchhra (Painful Micturation)
3. Mandagni (Decreased digestive power)
4. Malabandha (Constipation)

Shodhana

Method 01

अगस्त्यपत्रतोयेन भाविता सप्तवारकम्।
शृङ्गवेररसैर्वाऽपि विशुद्ध्यति मनःशिला।। (R.R.S. 3/93)
आर्द्रकस्वरसेनेह मनोगुप्तां तु भावयेत्।
सप्तवारं विधानेन शुद्धिमाप्नोति सर्वथा।। (R.T. 11/114)

1. Take the fine powder of ashuddha Manahshila and place it in a clean khalva yantra (mortar and pestle).
2. Triturate the powder with one of the following fresh juices (svarasa):
   - Agastya patra svarasa (juice of Agastya leaves)
   - Nimbu svarasa (lemon juice)
   - Ardraka svarasa (ginger juice)
3. Continue grinding until the mixture forms a consistent paste.
4. Perform this bhavana process seven times, ensuring complete drying between each cycle.
5. After the final bhavana, dry the purified Manahshila thoroughly.
6. Store the dried powder in an airtight container to maintain purity and potency.

Method 02

सुधोदके निपातिता मनःशिला तु चूर्णिता।
दिनत्रयाद्विनिर्गता भवेत्तु दोषवर्जिता।। (R.T. 11/109)

1. Roughly pound the ashuddha Manahshila into coarse pieces.
2. Place the pounded Manahshila in a vessel containing a sufficient amount of sudha jala (lime water).
3. Let it soak undisturbed for two days.
4. On the third day, wash the soaked Manahshila thoroughly with warm water to remove any residual impurities.
5. Dry the purified Manahshila completely.
6. Store the dried Shuddha Manahshila in an airtight container to preserve its purity and therapeutic properties.

Dose

तत्त्वांशतो रक्तिकाया: कलांशप्रमितां तथा।
शिला मात्रा विनिर्दिष्टा काशीनाथभिषक्तमै:।। (R.T. 11/117)

1/32 – 1/ 16th ratti (3.9 mgs - 7.8 mgs).

Anupana

According to Awstha

Properties

मन:शिला कटुस्तिक्ता स्निग्धोष्णा लेखनी गुरु:।
कासश्वासहरा कामं भूतोपद्रवनाशिनी।।
अग्निमान्द्यक्षयानाहहन्त्री कण्डुतिनाशिनी।
रसायनी ज्वरहरा वर्ण्या कामं विषापहा।। (R.T. 11/115-16)

- **Rasa**: Katu, Tikta
- **Guna**: Guru, Snigdha, Ushna
- **Virya**: Ushna
- **Vipaka**: Katu
- **Dosha**: Kapha Vatahara
- **Karma**: Rasayana, Lekhana, Agnideepana, Varnaya
- **Therapeutic Indication**: Kasa, Shvasa, Atikandu, Agnimandya, Chhardi, Jvara, Kushta, Anaha, Netra Roga, Apasmara.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

1. Grinding reduces Manahshila to fine particles, increasing surface area.
2. Forms a smooth paste during bhavana, with color changes indicating impurity removal.
3. Washing and soaking eliminate visible contaminants.

b. Chemical Changes

1. Neutralizes harmful elements (e.g., arsenic) and converts them to safer forms.
2. Acidic (svarasa) or alkaline (shuddha jala) agents stabilize and detoxify.
3. Soluble toxins are extracted during soaking.
4. Medicinal juices infuse bioactive properties into the material.

Importance of Temperature while Processing

- **Fac ilitates Detoxification:** Proper temperature helps remove toxic substances by enhancing interactions between the material and purifying agents.
- **Ensures Uniform Purification:** Controlled heating ensures even detoxification, preventing localized under-processing or over-processing.
- **Activates Purifying Agents:** Heat activates the biochemical properties of agents like svarasa or shuddha jala, improving their efficacy in removing impurities.
- **Prevents Material Degradation:** Maintaining optimal temperatures prevents the breakdown or volatilization of the material during purification.
- **Improves Absorption:** Heat aids the incorporation of therapeutic properties from purifying agents into the material.

Yoga

1. Shvasakuthara rasa
2. Manahshiladi dhuma
3. Kashayakesari rasa
4. Manahshiladi ghrita
5. Trailokyachintamani rasa
6. Manahshiladyanjana

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Manashila: An In-Depth Analysis Through the Classical Texts.	Rolli Ghildiyal, P. G. Scholar, Department of Rasa Shastra & Bhaisajya Kalpana, Uttarakhand Ayurved University, Rishikul Campus, Haridwar, Uttarakhand.	This study critically reviews classical texts on Manashila, detailing its origin, synonyms, classification, pharmacological properties, purification, incineration, therapeutic dose, indications, and extraction methods. It also explores artificial preparation techniques and discusses Realgar. Emphasis is placed on the use of Manashila exclusively in its purified form for internal and external therapy.
2.	Pharmaceutical - analytical study of the Ayurvedic purification of Manahshila (realgar)	Naveena Kodlady, Department of Rasashastra and Bhaishajya Kalpana including Drug Research, Institute for Post Graduate Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar-361008, Gujarat, India	This study reveals that Shodhana of Manashila using levigation with ginger juice results in only minor changes in its preliminary physico-chemical parameters. The chemical composition of Manashila remains largely unchanged after Shodhana. However, a significant reduction in particle size is observed, along with an approximately 12.4% increase in its weight post-purification.

Kampillaka (Mallotus Philippinensis)

Introduction

- Kampillaka is categorized as the first drug in the sadharana rasa group.
- Known scientifically as Mallotus philippinensis, it belongs to the spurge family (Euphorbiaceae).
- This herbal drug has been utilized therapeutically since the Samhita period.
- References to its use are found in major Ayurvedic texts, including the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya.
- Kampillaka plays a crucial role in various pharmaceutical processes, particularly in the purification and processing of mercury.
- Although it is of herbal origin, it is included in the uparasa group due to its importance in mercury-related formulations and alchemical practices.

Synonyms

Raktachurnaka, Rechaka, Karkasha, Rochana, Raktanga and Chandra.

Sources

- Found across Southeast Asia, Afghanistan, and Australia.
- The southernmost range is Mount Keira, located south of Sydney.
- In the Philippines, where the type specimen was first collected, it is locally known as Banato.
- Occurs in Bengal, Gujarat, northern Karnataka, the Malabar Hills, and the Chennai region.
- Grows as a bush or a small to medium-sized tree, reaching heights of up to 25 meters.
- The trunk can have a diameter of up to 40 cm.
- The flowering season occurs from March to April.
- Fruits can develop at any time of the year, typically maturing about three months after flowering.

Grahya Lakshana

इष्टिकाचूर्णसंकाशश्चन्द्रिकाढ्योऽतिरेचन:।
सौराष्ट्रदेशे चोत्पन्न: स हि कम्पिल्लक: स्मृता:।।
(R.R.S. 3/122)

1. Ishtika churna sankasha- like brick red dust.
2. Chandrikadya- Shining.
3. Atirechana- highly purgative.
4. Saurashtra deshe utpanna- found in Saurashtra.

Shodhana

1. Obtain a market sample of Kampillaka.
2. Use a wide-mouthed vessel filled with stable water.
3. Pour the Kampillaka sample into the water.
4. Genuine Kampillaka will float on the surface.
5. Brick powder or impurities will sink to the bottom.
6. Carefully skim the floating Kampillaka from the water surface.
7. Dry the collected Kampillaka thoroughly.
8. Store it in a clean, dry container labeled as Shuddha Kampillaka for pharmaceutical or therapeutic applications.

Properties

पित्तव्रणाध्मानविबन्धहारी श्लेष्मोदरार्त्तिकृमिगुल्महारी।
मूलामशोफज्वरशूलहारी कम्पिल्लको रेच्यगदापहारी।।
(R.R.S. 3/123)

- **Rasa**: Katu, Alpa-Lavana
- **Guna**: Laghu
- **Virya**: Ushna
- **Dosha**: Kapha- Pittahara
- **Karma**: Rechana, Vranaropana, Pachaka.
- **Therapeutic indications**: Adhmana, Vibandha (constipation), Udara roga, Udara krimi, Gulma roga, Arsha, Jvara, Shula.

Probable Physico-Chemical Changes

a. Physical Changes

- **Separation of Impurities**: Genuine Kampillaka floats, while denser impurities (e.g., brick powder) sink, leading to physical separation.
- **Texture and Consistency**: Kampillaka becomes cleaner and free of visible contaminants.
- **Drying**: Removes residual moisture, making Kampillaka suitable for storage and further use.

b. Chemical Changes

- **Detoxification**: Water may dissolve and wash away soluble impurities or unwanted chemical residues.
- **Stability Enhancement**: Interaction with water can stabilize the material, reducing inherent reactivity.
- This process ensures Kampillaka is physically purified, chemically stable, and suitable for therapeutic use.

Importance of Temperature while Processing

- **Moisture Removal:** Controlled heat during drying ensures complete removal of moisture, preventing microbial growth and preserving Kampillaka's quality.
- **Preservation of Integrity:** Optimal temperature prevents overheating, which could degrade Kampillaka's delicate components or alter its therapeutic properties.
- **Enhancement of Purity:** Mild heating can assist in evaporating residual impurities, improving the material's overall cleanliness.
- **Storage Preparation:** Proper drying at the right temperature ensures the material is stable and ready for long-term storage without risk of spoilage.

Yoga

1. Kampillaka malahara
2. Triphaladi ghrita
3. Patoladi churna
4. Bindu ghrita
5. Krimighatini gulika
6. Brahma ghrita

Research Updates

Sr.No.	Article Name	Author Name©	Result
1.	Kampillaka (Mallotus Phillipensis): A Wonder Drug in Ayurveda- A Review	Dr. Sonali Bihana Assistant Professor, Department of Dravya Guna, LBS Ayurveda Medical College, Bilaspur, HP.	This study highlights the medicinal potential of Kampillaka (Mallotus philippensis Muell Arg), native to the Northwest region and noted in ancient Ayurvedic texts. Known for its therapeutic uses in over 20 conditions, including worm infestation, skin diseases, and digestive disorders, Kampillaka's primary medicinal part is phalaraja, used after shodhana (purification). The plant contains antioxidants and novel chalcone derivatives, with its compound rottlerin showing significant anticancer potential, suggesting its valuable role in oncology and enhancing Ayurveda's global health impact.
2.	Therapeutic Efficacy of Kampillaka in Skin Disorder	Sony, P.G. Scholar, P.G. Department of Dravyaguna, L.H.S.P.G. Ayurveda college Pilibhit 262001, utturckhada	Kampillak (Mallotus philippinensis), a valued Ayurvedic herb, is traditionally used for skin disorders and numerous ailments. This tropical shrub contains diverse compounds, including steroids and phenols, with antimicrobial, antifungal, antiviral, antioxidant, and anti-inflammatory properties. Medicinal parts like root bark, leaves, and fruit dust aid in treating skin issues, bronchitis, infections, diabetes, and joint inflammation. This review highlights Kampillak's therapeutic potential.
3.	A Review of Kampillaka (Mallotus Philippinensis Muell) From Ayurvedic Perspective	Vijay Kumar Sangamesh Kotrannavar, PG Department of Rasashastra, K.L.E.University's Shri.B.M.K.Ayurveda Mahavidyalaya, Shahapur, Belgaum-590003, Karnataka, India	This study highlights that Ayurvedic texts classify Kampillaka's phalaraja under sadharana rasa varga, recommending purification before internal use. With properties like katu (pungent), amla rasa (sour), ushna virya (hot), it's primarily used as a purgative and treats skin diseases, wounds, ulcers, abdominal and urinary disorders, blood disorders, and acts as a contraceptive.

Navasadara (Ammonium Chloride)

Introduction

- Navasadara is recognized as the third mineral drug within the Sadharana Rasa group.
- Known chemically as Ammonium Chloride with the formula NH_4Cl.
- It is an inorganic compound appearing as a white crystalline salt.
- Highly soluble in water, forming solutions that are mildly acidic.
- The natural mineralogical form of ammonium chloride is referred to as Sal Ammoniac.
- Typically found on burning coal dumps, where it forms through the condensation of coal-derived gases.
- Navasadara is not mentioned in the classical texts of the Brihattrayi.
- Its references begin appearing in Rasashastra texts from the 8th century onwards.
- Due to its significant role in Paradakarma (alchemy involving mercury), it has been categorized as part of the Sadharana Rasa group.

Synonyms

नवसारी नव्यसारस्तथैव नवसादरः।
नृसादरो नृसारश्च नरसारश्च कीर्तितः।।
किट्टक्षारो निगदितस्तथैव नरसादरः।
चूलिकालवणं ख्यातं चुल्लिकालवणञ्च तत्।। (R.T. 14/1-2)

Navasara, Navyasara, Navasadara, Nrisadara, Nrisara, Narasara, Kittakshara, Narasadara and chullika lavana

Mineralogical Identification

Properties	Identification
Chemical Name	Ammonium Chloride
Chemical Composition	NH_4Cl
Colour	Colorless, White
Cleavage	Poor
Luster	Vitreous
Streak	White
Specific Gravity	1.53
Hardness	1 – 2
Fracture	Conchoidal
Transparency	Opaque

Sources

- Found abundantly in regions of Italy, Sicily, and various parts of Central Asia.
- Historically prepared by burning camel excreta.
- Also produced using the urine of camels or humans.
- Commonly found in areas where mud bricks are fired during production.
- Described as a yellowish-white kshara (alkaline substance).
- Obtained by burning the wood of two specific plants: Karira and Pilu.
- Found in household ovens where wood is burned for cooking.
- The salty residue (mud) inside the oven is dissolved in water, filtered, and the liquid is evaporated to yield Navasadara.

Type

2 type
1. Kritrima
2. Akritrima

Grahaya Lakshana

इष्टिकादहने जातं पाण्डुरं लवणं लघु। (R.R.S. 3/128)
Characteristic features of Navasadara are:
1. Ishtikadahane jatam- Obtained by burning bricks.
2. Pandura lavana- Yellowish white coloured salt.
3. Laghu- light.

Shodhana

नवसारन्तु सलिले त्रिगुणे द्रावयेद्भिषक्।
वस्त्रपूतं ततः कृत्वा भाजने स्थापयेत्ततः।।
चुल्लिकायां निधायाथ पचेत्तीव्राग्निना भृशम्।
जले शुष्के तलस्थञ्च नृसारं विमलं हरेत्।। (R.T. 14/3-4)

1. Take one part of Ashuddha Navasadara in a clean stainless steel vessel.
2. Add three parts of clean water to the vessel.
3. Stir the mixture thoroughly to ensure complete dissolution.
4. Filter the liquid using a clean cloth to remove impurities.
5. Transfer the filtrate to another clean vessel.
6. Place the vessel over a fire and boil the liquid until it fully evaporates.

7. Collect the fine white powder left at the bottom of the vessel.
8. Allow the collected powder to dry completely.
9. Store the dried powder in a suitable airtight container, labeled as Shuddha Navasadara.

Dose

द्विगुञ्जतश्चाष्टगुञ्जमितं तु नवसादरम्।
प्राणाचार्यः प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 14/8)

2 - 8 Ratti (250 mgs - 1 gm)

Properties

नवसारस्त्रिदोषघ्नः स्निग्धः सूक्ष्मो लघुस्तथा।
पाचकः सारकस्तीक्ष्णो जठराग्निप्रदीपनः।।
उष्णः प्लीहप्रशमनो मांसाजीर्णनिवारणः।
गुल्माध्मानप्रहरणः कफविश्लेषणः परम्।।
वृश्चिकोत्थविषघ्नश्च लोहद्रावणकस्तथा।
ह्रदामयहरो नेत्र्यः श्वित्रकुष्ठहरस्तथा।। (R.T. 14/5-7)

- **Rasa**: Amla, Lavana, Kshara
- **Guna**: Laghu, Sukshama
- **Virya**: Ushna
- **Dosha**: Tridoshahara
- **Karma**: Netrya, Saraka, Dipana, Pachana, Pitta- Saraka
- **Therapeutic Indications**: Gulma, Adhmana, Shvitra Kushtha.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Ashuddha Navasadara dissolves in water, separating soluble material from insoluble impurities.
- Insoluble impurities are physically removed through filtration with a clean cloth.
- Boiling removes water, leaving purified Navasadara as a fine white powder.
- The material transforms from coarse or contaminated to a fine, clean, crystalline powder.

b. Chemical Changes

- Soluble impurities or contaminants are left in the filtered water or removed during evaporation.
- Heat treatment during boiling enhances chemical stability, ensuring the material is safe and ready for use.
- The boiling process concentrates the active component of Navasadara while removing volatile or unnecessary substances.

Importance of Temperature while Processing

- **Complete Dissolution**: Warm water ensures thorough dissolution of Ashuddha Navasadara, facilitating the separation of impurities.
- **Efficient Filtration**: Mild heat reduces viscosity, aiding in the smooth passage of the solution through the filter cloth for impurity removal.
- **Evaporation Control**: Controlled boiling allows gradual evaporation of water without overheating, which could cause charring or decomposition of the material.
- **Formation of Fine Powder**: Proper temperature during evaporation ensures uniform crystallization of the purified Navasadara, yielding a fine, stable powder.

Yoga

1. Shveta parpati
2. Kshara parpati
3. Shankhadravaka (brihat)
4. Vrishchikadamsahara lepa
5. Rajavallabha rasa
6. Rohitakadya ghrita

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pharmaceutico-analytical Study of Navasadara Satva	Raghuveer, PhD Scholar, Dept of Rasashastra & Bhaishajya Kalpana, NIA Jaipur, Rajasthan, India	Navasadara (Ammonium Chloride; NH4Cl), a Sadharana rasa varga mineral, is highlighted in Rasatarangini for its deepana, kapha nissaraka, and ruchya properties, used for conditions like amlapitta and hrudaya dourbalya. This study focused on extracting Navasadara satva and analyzing its composition. The final product, NH4Cl, showed ammonia, sodium, chloride, calcium, and silica, with notable organoleptic changes.

Sr.No.	Article Name	Author Name	Result
2.	Navasadara Satvapatana: An Invitro Study	Raghuveer, PhD Scholar, Dept of Rasashastra & Bhaishajya Kalpana, NIA Jaipur, Rajasthan, India	The results indicate that Navasadara satva exhibits inhibitory activity at all tested concentrations (1:2, 1:5, and 1:10) against both Gram-positive and Gram-negative organisms. Staphylococcus pneumoniae showed a maximum inhibition zone of 29 mm at a 1:2 concentration, while E. coli demonstrated 32 mm at the same concentration, both values being close to the tested standard drug. This significant antimicrobial activity of Navasadara satva against these organisms supports its use in managing common infections caused by them.

Hingula (Red Cinnabar)

Introduction

- Hingula is the seventh mineral drug in the Sadharana Rasa group of Rasashastra.
- Known as Cinnabar in English, it is chemically identified as red sulfide of mercury (HgS).
- Contains approximately 86.2% mercury and 13.5% sulfur.
- Typically appears in massive, granular, or earthy forms with bright scarlet to brick-red coloration.
- Mined since the Neolithic Age and widely used during the Roman Empire.
- Historically valued as a pigment and the primary source of mercury.
- Cinnabar ore is crushed and roasted in rotary furnaces, separating mercury from sulfur.
- Mercury vapor is condensed into liquid and typically stored in iron flasks.
- Hingula is extensively documented in Rasashastra texts, which emphasize its importance in alchemy and medicine.

Synonyms

हिङ्गुलो हिङ्गुलचैव हिङ्गुलं चेङ्गुलाह्वयम्।
म्लेच्छं रक्तं सुरङ्गञ्च चित्राङ्गं चूर्णपारदम्।।
रसोद्भवो रसस्थानं रञ्जनं कपिशीर्षकम्।
रक्तकायो हंसपादो दरदञ्च प्रकीर्तितम्।। (R.T. 9/1-2)

Hingala, Hingula, Hingula, Ingula, Mlechchha, Rakta, Suranga, Chitranga, Churna-parada, Rasodbhava, Rasasthana, Ranjana, Kapishirshaka, Raktakaya, Hamsapada and Darada.

Mineralogical Identification

Properties	Identification
Chemical Name	Cinnabar
Chemical Composition	HgS
Colour	Brick Red
Cleavage	Perfect
Luster	Sub Metallic
Streak	Reddish Brown
Specific Gravity	8.176
Hardness	2 – 2.5
Fracture	Uneven
Transparency	Transparent

Sources

- Hingula (cinnabar) ores are found in several countries, including the United States, Iran, Spain, Italy, France, Germany, and Japan.
- Naturally occurring cinnabar is not found in India.
- Hingula can be synthesized artificially in laboratories for various uses.

Types

प्रथमः खनिजोऽन्यस्तु कृत्रिमो हिङ्गुलो मतः।
खनिजः खनितो जातः कृत्रिमो रसगन्धजः।। (R.T. 9/4)

Hingula is of two types:

1. Khanija hingula
2. Kritrima hingula

हिङ्गुलः शुकतुण्डाख्यो हंसपादस्तथाऽपरः।
प्रथमोऽल्पगुणस्तत्र चर्मारः स निगद्यते।
श्वेतरेखः प्रवालाभो हंसपादः स ईरितः।। (R.R.S. 3/147-149)

1. Shukatunda Hingula
2. Hamsapada Hingula

दरदस्त्रिविधः प्रोक्तश्चर्मारः शुकतुण्डकः।
हंसपादस्तृतीयः स्याद् गुणवानुत्तरोत्तरः।।
चर्मारः शुकवर्णः स्यात्सपीतः शुकतुण्डकः।
जपाकुसुमसङ्काशो हंसपादो महोत्तमः।। (Ay.Pra. 2/71)

1. Charmara Hingula
2. Shukatunda Hingula
3. Hamsapada Hingula

Grahya Lakshana

जपाकुसुमवर्णाभः पेषणे सुमनोहरः।
महोज्ज्वलो भारपूर्णो हिङ्गुलः श्रेष्ठ इष्यते।। (R.T. 9/3)

1. Look for Hingula that resembles the vivid red color of Japa Kusuma (Hibiscus rosa-sinensis).
2. Ensure the sample is easily triturated, indicating its suitability for processing.
3. Choose Hingula with a shiny and lustrous surface, which signifies quality.
4. Select Hingula that feels heavy, a characteristic of the best therapeutic variety.
5. This step-by-step guide helps in identifying high-quality Hingula for medicinal applications.

Doshas

अशुद्धो हिङ्गुलो मोहं प्रमेहं चित्तविभ्रमम्।
आन्ध्यं क्लमं तथा क्षैण्यं कुर्यात्तस्माद्विशोधयेत्।। (R.T. 9/11)

Shodhana

Method 01

निम्बूकस्वरसेनेह हिङ्गुलं श्लक्ष्णचूर्णितम्।
विभावयेत्सप्तवारं क्षालयेद्बहुशोऽम्भसा।। (R.T. 9/16)

1. Take Ashuddha Hingula in a clean Khalva Yantra (mortar and pestle).
2. Triturate the Hingula to obtain a fine powder.
3. Subject the powdered Hingula to seven Bhavanas (wet grinding cycles) using fresh Nimbu Svarasa (lemon juice).
4. Ensure the powder is thoroughly mixed with the juice during each cycle.
5. After completing the seventh Bhavana, wash the powder with warm water to remove any residual impurities.
6. Dry the washed powder completely.
7. Store the purified Hingula (Shuddha Hingula) in a suitable airtight container for future use.

Method 02

हिङ्गुलं चूर्णितं खल्वे शृङ्गवेराम्भसा ततः।
सप्तधा भावयेत्प्राज्ञो निर्मलो हिङ्गुलो भवेत्।। (R.T. 9/12)

1. Place Ashuddha Hingula in a clean Khalva Yantra (mortar and pestle).
2. Triturate the Hingula to form a fine powder.
3. Perform seven Bhavanas (wet grinding cycles) using fresh Ardraka Svarasa (ginger juice).
4. During each cycle, thoroughly mix the powder with the juice to ensure complete processing.
5. After completing the seventh Bhavana, wash the processed powder with warm water to remove residual impurities.
6. Dry the cleaned powder thoroughly.
7. Store the purified Hingula (Shuddha Hingula) in an airtight container to maintain its quality for therapeutic applications.

Dose

½ - 1 Ratti

Anupana

Maricha Churna+Guda, Honey, Pippali Churna.

Properties

लोचनामयहरः कफापहः पित्तजामयनिषूदनः परम्।
प्लीहकुष्ठगरकामलाहरो जाठराग्निजननोऽथ पाचनः।।
मेहवर्गपरितापनाशनो देहकान्तिबलबुद्धिवर्द्धनः।
आमवातगजदर्पखण्डनो हिङ्गुलो विजयते ज्वरापहः।। (R.T. 9/18-19)

- **Rasa**: Tikta, Kashaya, Katu
- **Guna**: Snigdha, Ushna
- **Virya**: Ushna
- **Vipaka**: Katu
- **Doshaghanata**: Tridoshahara
- **Therpeutic Indications**: Jvara, Amavata, Pliha roga (splenic disorders), Kushtha roga (skin diseases), Gara-visha, Prameha and Kamala roga (jaundice).

Probable Physico-Chemical Changes

During the Shodhana Process

a. Physical Changes

- Hingula is ground into a fine powder, increasing surface area for effective interaction with purifying agents (Nimbu Svarasa or Ardraka Svarasa).
- Repeated bhavana creates a uniform mixture, ensuring consistent detoxification.
- Washing with water removes insoluble and physical impurities.
- Hingula becomes smoother and finer after processing, enhancing its usability.
- The reddish color may brighten, indicating impurity removal and enhanced purity.

b. Chemical Changes

- Acidic (lemon juice) or bioactive (ginger juice) agents interact chemically with toxic compounds in Hingula, neutralizing or breaking them down.
- Soluble impurities dissolve in the purifying juices or are washed away during rinsing.
- Therapeutic properties from Nimbu Svarasa or Ardraka Svarasa may integrate into the material, enhancing its medicinal value.
- Repeated wet grinding cycles stabilize the processed Hingula, reducing its reactive nature.

Importance of Temperature While Processing

- Prevents decomposition of Hingula into toxic mercury vapors.
- Optimizes interaction with herbal juices during Bhavana.
- Avoids mercury vaporization and toxic fumes.
- Warm water effectively removes residues without degradation.
- Protects bioactive compounds during drying and processing.

Yoga

1. Hinguleshvara rasa
2. Anandabhairava rasa
3. Tribhuvanakirti rasa
4. Kasturibhairava rasa
5. Jvaramurari rasa
6. Vasantamalati rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Hingula (Red Sulphide of Mercury): A Conceptual Review	Jolly Saxena, Professor PG Department of Rasa Shastra & Bhaishjya Kalpana, Major S. D. Singh PG Ayurvedic Medical College and Hospital Farrukhabad (UP).	In conclusion, the use of Hingula (cinnabar) in India dates back to 200 BCE, with artificial preparation documented in the 13th-century text Rasa Ratnakar. Hingula was historically used in gold, silver, and metal extraction processes, indicating a gradual advancement in its applications. Therapeutically, Hingula has been utilized for Deepana (digestive stimulant), eye disorders, spleen disorders, jaundice, fever, skin diseases, rheumatoid arthritis, diabetes, and more. Given mercury's toxicity, Hingula requires thorough purification and incineration. Further studies are needed to minimize or eliminate toxicity, supporting global acceptance of Rasa-aushadhis (herbomineral formulations).
2.	Impact of Shodhana W.S.r.t to Heavy Metal on Hingula with Lakoocha Phala Svarasa (Artocarpus Lakoocha)	Dr. R. Surjith, Final year PG scholar, Dept. of Rasa Shastra & Bhaishajya Kalpana, Parul Institute of Ayurved, Parul University, Vadodara, Gujarat, India	In the present study, Hingula, a sadharana rasa, was subjected to the shodhana process using Lakoochaphalasvarasa through the method of Bhavana (levigation). An analytical study was conducted to observe the changes in heavy metals before and after shodhana. The results highlighted the significant role of the media used during the purification process. Heavy metal analysis, performed using Inductively Coupled Plasma-Atomic Absorption Spectroscopy, revealed notable differences between raw Hingula and Hingula purified with Lakoochaphalasvarasa (Artocarpus lakoocha).

Svarna (Gold)

Introduction

- Gold (Svarna), the premier pure metal, is dense, malleable, and ductile, with symbol Au (atomic number 79). A gram forms a one-square-meter shit; it's a superb conductor and resists corrosion.
- Esteemed in ancient texts like the Vedas, Upanishads, and Puranas, the Rigveda devotes a chapter to gold.
- Gold is celebrated in Charaka Samhita and Sushruta Samhita for detoxification, rejuvenation, vitality, and memory enhancement.

Synonyms

स्वर्णं सुवर्णं द्रविणं हिरण्यं कल्याणकं काञ्चनमग्निवर्णम्।
मनोहरं हेम च भूषणार्हं तथाग्निबीजं कनकञ्च कौन्तम्।।
भृङ्गारमाङ्गल्यकजाम्बवानि जाम्बूनदं भर्म च जातरूपम्।
चाम्पेयकं लोहवरञ्च रुक्मं चामीकरं हाटकसंज्ञमुक्तम्।। (R.T. 15/9-10)

Svarna, Suvarna, Dravina, Hiranya, Kalyanaka, Kanchana, Agnivarna, Manohara, Hema, Bhushana, Agnibija, Kanaka, Kaunta, Bhringara, Mangalyaka, Jambava, Jambunada, Bharma, Jatarupa, Champeyaka, Lohavara, Rukma, Charmikara and Hataka.

Mineralogical Identification

Properties	Identification
Chemical Name	Gold
Chemical Composition	Au
Colour	Golden Yellow
Cleavage	None
Luster	Metallic
Streak	Golden Yellow
Specific Gravity	15.5 – 19.3
Hardness	2.5 – 3
Fracture	Hackly
Transparency	Opaque

Sources

- Found in Precambrian-era rocks, gold occurs as native metal or gold-silver alloys (8–10% silver).
- Gold with over 20% silver, called electrum, varies from golden-silvery to silvery, with higher silver reducing specific gravity.
- Gold appears in rocks with quartz or sulfide minerals (lodes) or as flakes, grains, and nuggets in streams (placers) due to erosion and weathering.
- Gold combines with tellurium in minerals like calaverite and occurs in rare alloys with copper, lead, and mercury.

Types

प्राकृतं सहजं वह्निसम्भूतं खनिसम्भवम्।
रसेन्द्रवेधसञ्जातं स्वर्णं पञ्चविधं स्मृतम्।। (R.R.S. 5/2)

1. Prakrita suvarna
2. Sahaja suvarna
3. Agnisambhava suvarna
4. Khanija suvarna
   - Reef gold
   - Alluvial gold
5. Rasendravedhaja suvarna

Grahya Lakshana

दाहे रक्तं सितं छेदे निकषे कुङ्कुमप्रभम्।
गुरु स्निग्धं मृदु स्वच्छं निर्दलं रक्तपीतकम्।
हेम षोडशवर्णाऽऽढ्यं शस्यते देहलोहयोः।। (An.Kan., 2/2/12)

- **Red Glow on Heating**: When exposed to fire, the gold should glow red.
- **Uniform Luster**: The inner surface, when cut, must shine as brightly as the outer surface.
- **Distinctive Rub Marks**: Rubbing the gold on a stone should leave lines resembling the color of saffron (kunkuma kesara).
- **Heavier Weight**: The metal should feel heavier compared to other metals.
- **Soft and Smooth Texture**: The surface should be soft, smooth, clean, and visually appealing.
- **No Layers**: Gold should exhibit a homogenous structure without any layers.
- **Reddish-Yellow Shine**: It must possess a characteristic reddish-yellow brilliance.

Agrahyata Lakshana

कठिनं लघु रूक्षञ्च कषे च्छेदेऽनले सितम्।
तारताम्रसमायुक्तं स्वर्णं हेयं स्मृतं बुधैः।। (R.T. 15/13)

- **Lack of Malleability and Ductility**: Gold that is hard and lacks malleability and ductility is deemed unsuitable.
- **Light Weight**: A lighter weight compared to pure gold indicates it is unfit.
- **No Rub Marks**: Failing to leave lines when rubbed on a stone suggests impurities.
- **White Inner Surface**: A whitish appearance when cut signifies inferior quality.
- **Adulteration**: Such gold is often mixed with silver and copper, rendering it unsuitable for pharmaceutical or therapeutic use.

Dosha

Ashuddha & Apakva Svarna
Bhasma Sevana-janya Dosha

बलं च वीर्यं हरते नराणां रोगाव्रजं पोषयतीह काये।
असौख्यकार्यैव सदा सुवर्णमशुद्धमेतन्मरणं च कुर्यात्।।
असम्यङ् मारितं स्वर्णं बलं वीर्यं च नाशयेत्।
रोगान् करोति मृत्युं च तद्धन्याद्यत्नतस्ततः।। (Ay.Pra. 3/39-40)

Ashuddha = Bala-Virya Nasha, Asukha and Mrityukarka

Apakva = Balya- Virya- Harana, Mriytudayaka

Treatment

अभयासितयामुक्तां त्रिदिनं नृभिरङ्गने।
हेमदोष हरीख्याता सत्यं सत्यं न संशयः।।
(Br.R.R.Sun., p. 64)

Haritaki with Sita for 3 Days.

Shodhana

Samanaya Shodhana

तैले तक्रे गवां मूत्रे ह्यारनाले कुलत्थजे।
क्रमान्निषेचयेत्तप्तं द्रावे द्रावे तु सप्तधा।।
स्वर्णादिलोहपत्राणां शुद्धिरेषा प्रशस्यते।। (R.R.S. 5/13)

1. Gather thin shits of gold (kantakavedhi patra) and the required liquids:
   Sesame oil (Tilataila)
   Buttermilk (Takra)
   Cow urine (Gomutra)
   Fermented rice water (Aranala)
   Horse gram decoction (Kulattha kvatha)
2. Heat the gold shits until red-hot over a fire.
3. Immediately immerse the heated shits into one of the liquids.
4. Repeat the heating and dipping process: - 7 times for each liquid.
5. Total of 35 cycles for all liquids combined.
6. This process ensures the purification of the gold and removes impurities, making it suitable for further use.

Vishesha Shodhana

कर्षोन्मितानीह दलानि हेम्नः खल्वम्लपिष्टेन ससैन्धवेन।
वन्योपलोत्थेन तु भस्मना वै प्रलेपयेल्लेपविधानदक्षः।।
लेपं प्रशुष्कं प्रसमीक्ष्य वैद्यः शरावसंस्थानि तु कोकिलाग्नौ।
पुटेत्पुटे कुक्कुटसंज्ञके तु स्वर्णं भवेच्छोडशवर्णतुल्यम्।।
(R.T. 15/18-19)

1. Cut gold into thin foils of appropriate size (suchivedhi patra).
2. Take equal quantities of saindhava lavana (rock salt) and dry cow dung powder.
3. Mix with sufficient nimbu svarasa (lemon juice) to form a paste.
4. Apply the prepared paste thickly onto the gold foils.
5. Allow the coated foils to dry completely.
6. Place the dried, paste-coated gold foils in a suitable sharava samputa (crucible).
7. Enclose the crucible securely.
8. Subject it to one kukkuta puta cycle using glowing charcoal as the heat source.
9. Retrieve the purified gold (Shuddha svarna) after cooling.

Marana

Method-01

शुद्धसूतं समं स्वर्णं खल्वे कृत्वा तु गोलकम्।
ऊर्ध्वाधो गन्धकं दत्वा सर्वतुल्यं निरुध्य च।।
त्रिंशद्वनोपलैर्दद्यात् पुटान्येवं चतुर्दश।
निरुत्थं जायते भस्म गन्धो देयः पुनः पुनः।।
(Rase.Sa.Sam, 1/255-256)

1. Take Shuddha Parada and equal amounts of Shuddha Svarna (gold).
2. Triturate together in a mortar to form a homogeneous mixture, shaping it into a ball (Golaka).
3. Place this ball with shuddha gandhaka both above and below it in sharava and seal it. Then, administer Puta for 14 times.
4. Repeat this process until the bhasma passes the bhasma pariksha.

Method-02

शुद्धस्वर्णभवं चूर्णं तत्समं श्वेतमल्लकम्।।
काञ्जनारद्रवैर्मर्द्यं तुलसीस्वरसैस्तथा।
विधाय चक्रिकां शुष्कां ततो लघुपुटे पचेत्।।
द्वितीयादिपुटे देयं मल्लं पादमितं बुधैः।
अरुणाभं भवेद्भस्म हेम्नस्तु दशभिः पुटैः।।(R.Mr. 3/16-18)

1. Take all the ingredients as required.
2. First, triturate Shuddha Svarna and Shuddha Shveta Malla triturated.
3. Add Nimbu Kanchanara as marana drava dravya for one day.
4. Form thin, flat chakrikas and dry them under the sun.
5. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa.
6. Then, administer Laghu Puta. 2nd time obtained ist puta product add 1/4th part of Shuddha Shveta Malla and triturated with tulasi svarasa.
7. Then, administer Laghu Puta. This process is done by ten times. If more putas are needed, repeat this process until the bhasma passes the bhasma pariksha.

Dose

समारभ्याष्टमाद् भागाद् रक्तिकायां भिषग्वरः।
योजयेत्तूर्यभागान्तं मृतं स्वर्णं तु कालवित्।। (R.T. 15/81)

1/8th - 1/ 4th Ratti (15.6 mgs - 31.2 mgs)

Anupana

Honey, Butter.

Properties

मृतं सुवर्णं मधुरञ्च वृष्यं हृद्यञ्च नेत्र्यं परमञ्च मेध्यम्।
रसायनं पुंसवनोपयोगि विषापहं कान्तिकरञ्च शस्तम्।।
(R.T. 15/69)

- **Rasa**: Madhura, Tikta, Kashaya
- **Guna**: Shita, Guru, Snigdha
- **Virya**: Shita
- **Vipaka**: Madhura
- **Dosha**: Tridoshahara
- **Karma**: Medhya, Vrishya, Yogavahi, Ojovardhaka, Varnya, Rasayana.
- **Therapeutic Uses**: Grahani, Amalpitta, Hikka, Pandu, Shvasa Roga, Jvara, Dhatu Kashaya, Apasmara, Rajayakshma, Buddikshaya, Hridroga, Snayudaurbalya, Sharira Varna, Unmada, Svarabheda, Visha, Vajikarana, Rasayana, Medhya, Smritivardhaka.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Reduction in particle size (e.g., fine powder, thin foils).
- Coating, drying, and structural refinement during heating.

b. Chemical Changes

- Oxidation of impurities.
- Detoxification through reactions with herbal juices.
- Volatilization of toxic and unwanted elements.

During Marana Process

a. Physical Changes

- Transformation of metals into microfine powder (bhasma).
- Loss of metallic luster and homogenization with Gandhaka.

b. Chemical Changes

- Amalgamation with Parada.
- Formation of gold sulfides and oxidation products.
- Stabilization of gold into a bioavailable form.

Importance of Temperature While Processing

- Prevents melting or vaporization, aiding in impurity removal.
- Preserves gold's physical properties without degradation.
- Ensures proper amalgamation and conversion into bhasma.
- Prevents loss or incomplete reactions.
- Promotes uniform particle size reduction and stabilization.
- Avoids toxic fumes and retains therapeutic efficacy.

Yoga

1. Svarna parpati
2. Hemagarbha pottali rasa
3. Kasturibhairava rasa
4. Yogendra rasa
5. Shvasakasachintamani rasa

Research Updates

Sr.No	Article Name	Author Name	Result
1.	Pharmaceutical Standardization of Svarna Bhasma (Incinerated Gold) by Adopting Traditional Method	Sanjay B Khedekar, Research Lab, Dept of RS & BK, SSAM & H, Hirawadi, Nashik, Dist Nashik, Maharashtra, India	In the present study, Svarna Bhasma (gold ash) was prepared and analyzed to establish its standard parameters. Three batches of SB were prepared, and procedures such as Shodhana (purification) and Marana (incineration) were followed as per classical texts. A specialized heating pattern was used during the preparation. After thirty subsequent Putas (heating cycles), an 18% loss was observed. The final product contained 52.33% elemental gold.
2.	Blood compatibility studies of Svarna bhasma (gold bhasma), an Ayurvedic drug	Willi Paul, Division of Biosurface Technology, Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, AP, India	This study assesses the protein adsorption, blood compatibility, and complement activation of two batches of Svarna Bhasma, alongside its physicochemical properties. The preparations, with crystallite sizes of 28–35 nm, showed no blood cell aggregation, protein adsorption, or complement activation. They were non-cytotoxic and facilitated tight junction opening in Caco-2 cells. These findings support the biological safety of Svarna Bhasma, suggesting its potential as a therapeutic agent in clinical medicine.

Sr.No.	Article Name	Author Name	Result
3.	Svarna Bhasma as a Nanomedicine in Ayurveda: A Comprehensive Review on its Efficacy in Remediation of Rheumatoid Arthritis	Padmanav Koushik Senior Research Fellow, Department of Biotechnology funded North East Centre for Agricultural Biotechnology (DBT-NECAB), Assam Agricultural University, Jorhat, Assam, India	Research suggests that nano-sized gold particles in Svarna Bhasma have anti-inflammatory and immunomodulatory effects, enhancing gold bioavailability for targeted tissue delivery. In rheumatoid arthritis, Svarna Bhasma offers a holistic therapeutic approach by regulating immune dysregulation, promoting self-tolerance, and providing long-term relief. As nanomedicine advances, further clinical studies are needed to validate its efficacy and integrate Svarna Bhasma into modern healthcare practices for autoimmune disorders.

Rajata (Silver)

Introduction

- Rajata (silver) is recognized as the second pure metal, symbolized as Ag (Latin: argentum) with atomic number 47.
- Known for its softness, white hue, and luster, silver exhibits the highest electrical and thermal conductivity among metals. It reflects 95% of light rays, making it the most lustrous metal.
- Silver has been valued since ancient times, referenced in texts like the Vedas, Upanishads, and Puranas, often mentioned as coins, utensils, and ornaments.
- Ayurveda has utilized silver in treatments since its inception, as documented in Charaka Samhita and Sushruta Samhita.
- With the development of Rasashastra, silver's medicinal properties were extensively explored, described, and applied in therapies.

Synonyms

रजतं रुचिरं रौप्यं तारं सौधञ्च शुभ्रकम्।
चन्द्रलोहं चन्द्रहासं रूपकं चन्द्रसंज्ञकम्।। (R.T. 16/1)

Rajata, Ruchira, Raupya, Tara, Saudha, Shubhraka, Chandraloha, Chandrahasa and Rupaka.

Mineralogical Identification

Properties	Identification
Chemical Name	Silver
Chemical Composition	Ag
Colour	Silvery white
Cleavage	None
Luster	Metallic
Streak	Slivery White
Specific Gravity	10 -11
Hardness	2.5 – 3
Fracture	Jagged
Transparency	Opaque

Sources

- Silver is found in its native form, as an alloy with gold (*electrum*), and in ores containing sulfur, arsenic, antimony, or chlorine.
- Notable silver ores include:
  - Argentite (Ag_2S)
  - Chlorargyrite (AgCl), also known as horn silver
  - Pyrargyrite (Ag_3SbS_3)
- Silver is mainly extracted from copper, copper-nickel, lead, and lead-zinc ores. Major sources include Peru, Bolivia, Mexico, China, Australia, Chile, Poland, and Serbia.
- Peru, Bolivia, and Mexico have mined silver since 1546 and remain leading global producers.
- Prominent silver mines include:
  - Cannington (Australia)
  - Fresnillo and Penasquito (Mexico)
  - San Cristobal (Bolivia)
  - Antamina (Peru)
  - Rudna (Poland)
- In India, silver is mined in Rajasthan and as a by-product in the gold mines of Kolar and Hatti in Karnataka.

Types

सहजं खनिजसञ्जातं कृत्रिमं त्रिविधं मतम्।
रजतं पूर्वपूर्वं हि स्वगुणैरुत्तरोत्तरम्।। (R.R.S. 5/22)

1. Sahaja Rajata
2. Khanija Rajata
3. Kritrima Rajata

Depending on the source- 2 types

1. Mukta Rajata
2. Khanija Rajata

Grahya Lakshana

निर्मलं पिच्छिलं स्निग्धं मृदुलं निर्दलं घनम्।
शरदिन्दुनिभं यच्च रजतं जात्यमुच्यते।। (R.T. 16/3)

- **Clean**: The silver is pure and free of impurities.
- **Pichchhila (Shiny)**: It exhibits a bright, shiny appearance.
- **Snigdha (Smooth)**: The surface of the silver is smooth to touch.
- **Mridu (Soft)**: It has a soft texture, indicative of its malleability.
- **Nirdala (With No Layers)**: The silver is uniform, lacking any visible layers or inconsistencies.
- **Ghana (Heavy)**: It feels dense and substantial in weight.
- **Bright Full Moon-Like Appearance**: Its luster resembles the glow of a full moon, enhancing its aesthetic appeal.

Agrahyata Lakshana

दाहेऽतिमलिनं पीतं रक्तं रूक्षं लघु स्फुटम्।
कठिनं सदलञ्चैव रजतं त्याज्यमुच्यते।। (R.T. 16/4)

- **Appears Dirty When Heated**: The silver tarnishes or shows signs of dirtiness upon exposure to fire.
- **Yellowish or Reddish Shades**: It displays unnatural yellow or red tones, deviating from its ideal color.
- **Rough Surface**: The surface of the silver is uneven and lacks smoothness.
- **Light Weight**: It feels unusually lightweight, indicating poor quality.
- **Brittle or Very Hard**: The silver either breaks easily or is excessively hard, reducing its usability.
- **Presence of Layers**: It shows visible layers or inconsistencies in its structure.

Dosha

Ashuddha and Apakva Rajata Bhasma Sevana-janya Dosha

आयुः शुक्रं बलं हन्ति तापविड्बन्धरोगकृत्।
अशुद्धं न मृतं तारं शुद्धं मार्यमतो बुधैः।। (R.R.S. 5/30)

Ayu-Shukra-Bala Nashana, Santapa, Vibandha.

Treatment

शर्करा मधु संयुक्तं सेवयोद्योदिनत्रयम्।
अपक्व रौप्य दोषेण विमुक्त सुखमष्णुते।।
(Bri.R.Raj.Sun. p.68)

Sharkara with Honey for 3 days.

Shodhana

पत्तलीकृतपत्राणि राजतानि भिषग्वरः।
वह्नौ प्रतापयेत्कामं वङ्कनालप्रदीपिते।।
ततो निम्बूकजद्रावे चाङ्गेरीस्वरसेऽपि वा।
स्नपयेत्तप्ततप्तानि भूयो भूयः प्रयत्नतः।।
यावद्राजतपत्राणि मार्दवं यान्ति निर्भरम्।
वीतशङ्कस्ततो वैद्यो मारणाय प्रयोजयेत्।। (R.T. 16/10-12)

1. Obtain thin foils of silver.
2. Prepare glowing charcoal and connect it to a blower (vankanala) to maintain a consistent heat source.
3. Have a container of nimbu svarasa (lemon juice) ready for dipping.
4. Place the silver foils over the glowing charcoal.
5. Heat the foils until they turn red-hot.
6. Carefully remove the red-hot foils and immediately dip them into the nimbu svarasa.
7. Repeat the heating and dipping process multiple times.
8. Continue until the silver foils become smooth and achieve the desired texture.
9. Once the foils are purified and smooth, they are ready for use in the incineration process.
10. This method ensures the silver is adequately purified for therapeutic or further processing purposes.

Marana

Method 01

कर्षद्वयमितं तारं विशुद्धन्तु समाहरेत्।
रसेश्वरं तारतुल्यं निर्मलञ्च हरेद्भिषक्।।
खल्वे सम्पेष्य यत्नेन पिष्टिकां कारयेत्ततः।
निम्बूकस्वरसं दत्त्वा दिनमेकं सुपेषयेत्।।
ततः प्रक्षालयेत्कामं सलिलेन भिषग्वरः।
शुद्धं सौगन्धिकं तुल्यं तथैव नटभूषणम्।।
निक्षिप्य चाथ सम्पेष्य श्लक्ष्णचूर्णञ्च कारयेत्
शरावसम्पुटे न्यस्य पुटेत्स्वल्पपुटे ततः।।
एवं पुटत्रयेणैव रजतं मृतिमाप्नुयात्।
भस्म सञ्जायते चैवं रक्तोत्पलसमप्रभम्।। (R.T. 16/17-21)

1. Collect Shuddha Rajata, Shuddha Parada, Nimbu Svarasa, Shuddha Gandhaka, and Shuddha Haratala.
2. Mix Shuddha Rajata and Shuddha Parada, triturating until smooth.
3. Incorporate Nimbu Svarasa, triturate for one day, and wash thoroughly.
4. Add Shuddha Gandhaka and Shuddha Haratala, and triturate well.

5. Apply three Laghuputas, allowing cooling after each.
6. Perform bhasma pariksha. If needed, repeat the heating process until it passes the test.
7. The purified Rajata Bhasma is ready for therapeutic use.

Method 02

समाहरेत्सुविमलं तारपत्रकणाच्चयम्।
निम्बूकद्रवसंशुद्धं निरम्लाकृतमिङ्गुलम्।।
तारद्विगुणितं दत्त्वा पिष्टवा चूर्णञ्च कारयेत्।
ऊर्ध्वपातनयन्त्रेण पचेत्पाकविधानवित्।।
भूयो भूयः पचेद्यावद्रजतं मृतिमाप्नुयात्।
अधःस्थं सुमृतं तारं कृष्णाभमतिसुन्दरम्।।
आहरेदूर्ध्वसंस्थन्तु रसेशञ्जातिनिर्मलम्।
एवं मृतं चन्द्रलोहं तत्त्वाद्योगेषु योजयेत्।। (R.T. 16/37-40)

1. Collect Shuddha Rajata, Shuddha Hingula, and Nimbu Svarasa.
2. Mix Shuddha Rajata and Shuddha Hingula, triturating with Nimbu Svarasa for one day.
3. Shape into thin chakrikas (discs) and dry under the sun.
4. Place chakrikas in a Sharava Samputa.
5. Seal with Sandhi Lepa.
6. Apply 14 Kukkuta Putas (heating cycles).
7. Conduct bhasma pariksha. If it fails, repeat the process until the bhasma passes.
8. The finished Rajata Bhasma is ready for use.

Dose

रक्तिकायास्तुरीयांशादृक्तिकैकमितं परम्।
मृतं तारं नियुञ्जीत बलकालाद्यपेक्षया।। (R.T. 16/54)

1/4th – 1 Ratti (31 mgs - 125 mgs)

Anupana

Chitraka Mula Kashaya, Parpataka Kashaya, Ushira Kashaya, Brahmi Rasa, Honey.

Properties

रूप्यं विषाकमधुरं तुवराम्लसारं शीतं सरं परमलेखनकं रूप्यम्।
स्निग्धं च वातकफजिज्जठराग्निदीपि बल्यं परं स्थिरवयस्करणञ्च मेध्यम्।।
रौप्यं शीतं कषायाम्लं स्निग्धं वातहरं लघु।
रसायनविधानेन सर्वरोगापहारकम्।। (R.R.S. 5/27-28)

- **Rasa**: Kashaya, Amla
- **Guna**: Guru, Snigdha, Sara.
- **Virya**: Shita
- **Dosha**: Vata- Kaphahara
- **Karma**: Balya, Varnya, Vrishya, Dipana, Pachana, Rasayana.
- **Therapeutic Uses**: Shosha, Dhatu Kshaya, Prameha, Madatyaya, Visha, Jvara, Pitta Roga, Pliha Roga, Buddhimaandya, Garbhashaya Dosha, Apasamara.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Repeated heating and dipping soften silver foils, making them smooth and pliable.
- Oxidized layers and physical contaminants are dislodged during dipping and abrasion.

b. Chemical Changes

- Surface contaminants oxidize under heat.
- Dipping red-hot foils into acidic media (like lemon juice) aids in reducing oxides and neutralizing impurities.
- Acidic components react with impurities, enhancing silver's purity.

During Marana Process

a. Physical Changes

- Trituration and repeated heating convert silver into microfine bhasma.
- Silver transitions from metallic to a dull, powdery form.
- Uniform mixing with sulfur (Gandhaka) and mercury (Parada) ensures even processing.

b. Chemical Changes

- Silver combines with mercury to form silver amalgam.
- Silver reacts with sulfur during heating to form silver sulfide (Ag_2S).
- Repeated puta cycles stabilize silver into a bioavailable, inert form.
- Conversion to bhasma ensures complete detoxification and therapeutic readiness.

Importance of temperature while processing

- Adequate heating ensures oxidation of surface impurities and loosens contaminants.

- Controlled temperature prevents melting or structural damage to the silver foils.
- Heating red-hot silver and quenching it in acidic media (e.g., lemon juice) aids in removing toxic elements effectively.
- Proper temperature supports the reaction of silver with Parada (mercury) and Gandhaka (sulfur), forming silver amalgams or sulfides.
- Avoids decomposition or incomplete reactions that could affect the final product's quality.
- Overheating can lead to silver loss due to oxidation or vaporization; controlled heating ensures material conservation.
- Repeated heating cycles at appropriate temperatures promote uniform particle size reduction and stabilization.
- Controlled temperature minimizes toxic fume generation and ensures the bhasma is stable, inert, and therapeutically effective.

Yoga

1. Vijaya parpati
2. Kasturibhairava rasa
3. Trailokyachintamani rasa
4. Makaradhvaja rasa
5. Grahanikapata rasa
6. Vishamajvarantaka lauha

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Therapeutic Potential of Rajata (Silver) Bhasma: A Review	Kajree Pardeshi, PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, SDMCA Hassan, Karnataka, India.	Rajata Bhasma is used in Ayurvedic formulations for various systemic disorders, including neurological, psychological, and infectious conditions, due to its antimicrobial properties. While classical texts highlight its therapeutic uses, there is a need for clinical studies and scientific data to validate its efficacy in modern healthcare.
2.	Pharmaceutical Study Of Rajata Bhasma By Two Different Methods	Dr. Diksha Sharma, P.G. Department of Rasa Shastra and Bhaishajya Kalpana, R.G.G.P.G. Ayurvedic College, Paprola.	Two batches of Rajata Bhasma were prepared using different methods. Rajata Bhasma I followed Rasa Tarangini, while Rajata Bhasma II followed Ayurveda Prakash. Despite the variations in preparation, both batches showed similar results. Rajata Bhasma I used Shudha Rajata Patra, Shudha Parada, Shudha Gandhaka, Shudha Hartaala, and Nimbu Svarasa, while Rajata Bhasma II used Shudha Rajata Patra, Samguna Kajjali, and Ghritakumari Svarasa. Both batches underwent Laghu Puta at 450–650, with 18 Putas for Rajata Bhasma I and 17 for Rajata Bhasma II. The yields were 84.2% for Rajata Bhasma I and 95% for Rajata Bhasma II.
3.	Physicochemical characterization and antibacterial activity of Rajata Bhasma and silver nanoparticle	Revati Sharma, Department of Microbiology, MGM Medical College and Hospital, Navi Mumbai, Maharashtra, India	SEM analysis of Rajata Bhasma (RB) showed particles between 10-60 nm. UV-visible spectrum indicated an absorption peak at 423 nm, while TEM revealed spherical SNPs of 5-50 nm, evenly distributed. ICP-AES showed silver content of 70.56% in RB and 65.23% in SNP. Staphylococcus aureus was sensitive to both, while E. coli, P. aeruginosa, and E. faecalis were resistant. RB contains silver nanoparticles and demonstrates mild antibacterial activity.

Tamra (Copper)

Introduction

- Tamra, or copper, is recognized as the third suddha loha (purified metal) in traditional systems like Ayurveda.
- Copper is represented by the symbol Cu (from Latin cuprum) with an atomic number of 29.
- It is a ductile, highly conductive metal for both heat and electricity.
- Pure copper is soft, malleable, and features a reddish-orange hue when freshly exposed.
- It serves as a key material in heat and electricity conduction, construction, and the creation of metal alloys.
- Copper is an essential trace element for plants and animals, though not all microorganisms.
- The human body contains 1.4 to 2.1 mg of copper per kg of body mass.
- Absorbed in the gut, it binds to albumin for liver processing, after which it is distributed to other tissues.
- Studies over the past decade have demonstrated copper's effectiveness in destroying various

bacteria, viruses (e.g., influenza A, adenovirus), and fungi.

- Copper has a long history, with references as coins, utensils, and ornaments in ancient texts like the Vedas, Upanishads, and Puranas.
- Its medicinal use has been documented since the early days of Ayurveda.
- Texts like Charaka Samhita mention tamra and its visha lakshana (toxic characteristics).
- With the rise of Rasashastra, copper was extensively studied, described, and used for its therapeutic benefits.

Synonyms

ताम्र शुल्बं रक्तकं म्लेच्छवक्त्रं नेपालीयं त्र्यम्बकं सूर्यलोहम्।
त्वाष्ट्रं त्वर्कं सूर्यपर्यायसंज्ञं द्विष्टं द्वयष्टं त्वम्बकं कीर्तितं तत्।।
उदुम्बरञ्चारविन्दं सूर्याङ्गं लोहितायसम्।
रविप्रियं भास्करं च ताम्रकं च प्रकीर्तितम्।। (R.T. 17/1-2)

Tamra, Shulba, Raktaka, Mlechchhavaktra, Nepaliya, Tryambaka, Suryaloha, Tvashtra, Ark, Dvishta, Dvayashta, Ambaka, Udumbara, Aravinda, Suryanga, Lohitayasa, Ravipriya, Bhaskara and Tamraka.

Mineralogical Identification

Properties	Identification
Chemical Name	Copper
Chemical Composition	Cu
Colour	Copper Red
Cleavage	None
Luster	Metallic
Streak	Copper Red
Specific Gravity	8.90
Hardness	2.5 – 3
Fracture	Hackly
Transparency	Opaque

Sources

- Copper exists either in its native form or combined within various minerals. Examples include:
  - **Copper Sulphides**: Chalcopyrite and chalcocite
  - **Copper Carbonates**: Azurite and malachite
  - **Copper Oxides**: Cuprite
- Copper is present at approximately 50 parts per million (ppm) in the Earth's crust.
- Copper is synthesized within massive stars through stellar nucleosynthesis processes.
- Major global producers include:
  - **United States**: Accounts for about 1/7th of the world's copper production.
  - **Canada**: Produces roughly 1/10th of the world's copper.
  - **Additional leading producers**: Australia, China, Russia, Peru, Mexico, Chile, Zaire (Democratic Republic of Congo), Zambia, and neighboring Bhutan.
- Key mining locations are:
  1. Sikkim
  2. Nellore District
  3. Andhra Pradesh

Types

म्लेच्छं नेपालकं चेति तयोर्नेपालकं वरम्।
नेपालादन्यखन्युत्थं म्लेच्छमित्यभिधीयते।। (R.R.S. 5/42)
नेपालं म्लेच्छकम् चेति ताम्रं द्विविधमुच्यते।
नेपालं जात्यमाख्यातं म्लेच्छकं त्ववरं स्मृतम्।। (R.T. 17/7)

Two Types

1. Nepalika Tamra
2. MalechchhaTamra

Grahya Lakshna

सुस्निग्धं मृदुलं शोणं घनाघातक्षमं गुरु।
निर्विकारं गुणश्रेष्ठं ताम्रं नेपालमुच्यते।। (R.R.S. 5/44)

- The finest type of copper is characterized by its snigdha guna—a smooth, soft surface that is pleasant to touch.
- It exhibits a rich, reddish hue, distinguishing it from other metals.
- This superior copper variety shows exceptional malleability and ductility, allowing it to withstand significant deformation (ghanaghata kshamatva).
- Known for its heaviness (guru), this copper is denser compared to lesser-quality variants.
- These combined attributes—smooth texture, reddish color, malleability, and substantial weight—define it as the highest-grade copper, traditionally referred to as Naipali Tamra.

Agrahyata Lakshana

सदलं पाण्डुरञ्चैव कठिनं लघु भङ्गुरम्।
समलं त्वरविन्दन्तु वर्जयेद्रसकर्मणि।। (R.T. 17/5)

- Copper with a layered or flaky texture is considered substandard for pharmaceutical use.
- Inferior copper often has a pale or whitish tint rather than a pure reddish hue.
- Avoid copper that is either excessively hard, brittle, or unusually lightweight, as these traits indicate poor quality.
- Copper containing adulterants, such as iron, lead, or other foreign metals, is unsuitable for medicinal applications.
- For pharmaceutical procedures, only pure, high-quality copper should be used, free from structural flaws and contaminants.

Doshas

General Dosha

न विषं विषमित्याहुस्ताम्रं तु विषमुच्यते।
एको दोषो विषे ताने त्वष्टौदोषाः प्रकीर्तिताः।।
भ्रमो मूर्च्छा विदाहश्च स्वेदक्लेदनवान्तयः।
अरुचिश्चित्तसन्ताप एते दोषाः विषोपमाः।।

(Ay.Pra. 3/115-117)

1. Bhrama (Giddiness)
2. Murchchha (Syncope)
3. Vidaha (Burning sensation)
4. Sveda (Perspiration)
5. Kleda (Excessive sebaceous secretion)
6. Vamana (Vomiting)
7. Aruchi (Anorexia)
8. Chittasantapa (Restlessness)

Ashuddha & Apakva Tamra Bhasma Sevana-janya Dosha

दाहः स्वेदोऽरुचिर्मूर्च्छा क्लेदो रेको वमिर्भ्रमः।
असम्यक्छोधिते दोषास्ताम्रेऽसम्यक् च मारिते। (Ay.Pra. 3/147)

Daha, Sveda, Aruchi, Murchchha, Kleda, Rechana, Vamana and Bhrama.

Treatment

मुनिब्रीहिं सितापानं धान्यकं वा सितासह।
ताम्रदोषमशेषं वै पिबान्यहयाद्दिनत्रयम्।।

(Br.R.Raj.Sun., p 74)

Dhanyaka Svarasa with Sita for three days.

Shodhana

Method 01

ताम्रनिर्मलपत्राणि लिप्त्वा निम्ब्वम्बुसिन्धुना।
ध्मात्वा सौवीरकक्षेपाद्विशुद्धयत्वष्टवारतः।। (R.R.S. 5/50)

1. Mix the required quantities of Saindhava Lavana (rock salt) with Nimbu Svarasa (lemon juice).
2. Triturate the mixture thoroughly to form a smooth paste.
3. Apply the prepared paste thickly on both sides of the impure copper (Ashuddha Tamra) foils.
4. Secure the coated foils using a Sandamsa Yantra (metal tong or clamp).
5. Heat the foils until they are red-hot.
6. Immediately dip the red-hot foils into a vessel containing an adequate amount of Kanji (fermented rice water).
7. Repeat the entire process (coating, heating, and quenching) eight times to ensure thorough purification.
8. Once purified, store the Shuddha Tamra (pure copper) in a suitable airtight container for pharmaceutical applications.

Method 02

निम्ब्वम्बुपटुलिप्तानि तापितान्यष्टवारकम्।
विशुध्यन्त्यर्कपत्राणि निर्गुण्डीरसमज्जनात्।। (R.R.S. 5/51)

1. Combine the required quantities of Saindhava Lavana (rock salt) with Nimbu Svarasa (lemon juice).
2. Triturate the mixture thoroughly to form a smooth, consistent paste.
3. Apply the prepared paste evenly and thickly on both sides of the Ashuddha Tamra (impure copper) foils.
4. Hold the coated foils securely using a Sandamsha Yantra (metal tongs or clamp).
5. Heat the foils until they become red-hot.
6. Immediately immerse the red-hot foils into a vessel containing sufficient Nirgundi Patra Svarasa (juice extracted from Nirgundi leaves).
7. Repeat the process of coating, heating, and quenching eight times to ensure complete purification of the copper.
8. After the final cycle, store the purified copper (Shuddha Tamra) in a suitable airtight container, ready for pharmaceutical use.

Marana

सूक्ष्माणि ताम्रपत्राणि कृत्वा संस्वेदयेद् बुधः।
वासरत्रयमम्लेन ततः खल्वे विनिक्षिपेत्।।

पादांशं सूतकं दत्त्वा याममम्लेन मर्दयेत्।
तत ऊद्धृत्य पत्राणि लेपयेद् द्विगुणेन च।।
गन्धकेनाम्लधृष्टेन तस्य कुर्याच्च गोलकम्।
ततः पिष्ट्वा च मीनाक्षीं चांगेरीं वा पुनर्नवाम्।।
तत्कल्केन बहिर्गोलं लेपयेदङ्गुलोन्मितम्।
धृत्वा तद्गोलकं भाण्डे शरावेण च रोधयेत्।।
बालुकाभिः प्रपूर्याथ विभूतिलवणाम्बुभिः।
दत्त्वा भाण्डमुखे मुद्रां ततश्चुल्ल्यां विपाचयेत्।।
क्रमवृद्धाग्निना सम्यग्यावद्याममचतुष्टयम्।
स्वाङ्गशीतलमुद्धृत्य मर्दयेत्सूरणदृवैः।।
दिनैकं गोलकं कुर्यादर्धगन्धेन लेपयेत्।
सघृतेन ततो मूषां पुटे गजपुटे पचेत्।।
स्वाङ्गशीतं समुद्धृत्य मृतं ताम्र शुभं भवेत्।

(Sha.S.M.Kh. 11/28-34)

1. The fine tamra leaves are subjected to svedana with nimbu svarasa for three days using a dola yantra.
2. After this, one-fourth shuddha parada and nimbu svarasa are triturated together for one yama (approximately three hours). This causes the mercury to adhere to the tamra leaves.
3. Next, take double the amount of shuddha gandhaka with nimbu svarasa and triturate it and apply it to the copper leaf and make a ball of it.
4. After this, grind minakshi dravya, Changeri or punarnava and apply thick paste on top of this ball and then mix ash and salt in water and fill the pot with it.
5. Then, close the lid, put it on the stove and keep it Manda, Madhya, and Tivra until it cools down.
6. Remove the balls from the pot when they cool down and make a ball by triturating it with a Jimikanda rasa the next day.
7. Then take half Shuddha Gandhaka from Tamra and apply it to the Tamra ball in ghee. And sharava samputa is done and the Gaja Puta is given.

Dose

अष्टमांशादृक्तिकाया रक्तिकार्द्धमितं परम्।
मृतं ताम्रं प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 17/52)

Dose: 1/8th – ½ ratti (15.6 - 62.5 mgs)

Properties

ताम्रं तिक्तं तुवरमधुरं पाकतश्चोष्णवीर्यं त्वम्लं स्निग्धं खलु विषहरं सारकं लेखनञ्च।
पित्तोद्भूतानपि च कफजान् श्लेष्मपित्तोत्थितान् वा घोरान् रोगानपि हि चिरजानप्यशेषांश्च हन्यात्।। (R.T. 17/45)
ताम्रं कषायं मधुरं लेखनं शीतलं सरम्। (R.Mri. 3/35)
ताम्रं तिक्तकषायकञ्च मधुरं पाकेऽथ वीर्योष्णकं साम्लं पित्तकफापहं जठररुक् कुष्ठामजन्त्वन्तकृत्।
ऊर्ध्वाधः परिशोधनं विषकृत् स्थौल्यापहं क्षुत्करं दुर्नामक्षयपाण्डु-रोगशमनं नेत्र्यं परं लेखनम्।। (R.R.S. 5/46)

- **Rasa**: Tikta, Kashaya, Madhura
- **Guna**: Snigdha
- **Virya**: Ushna
- **Vipaka**: Amla
- **Dosha**: Pitta – Kaphahara
- **Krama**: Pitta Saraka, Lekhana.
- **Therapeuctic Indications**: Visha, Krimi, Sthaulya, Kasam Shvasa, Amlapitta, Shula, Pliha Roga, Grahani, Mutrakrichchhra, Jara, Arochaka, Jvara.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Heating and quenching repeatedly soften the copper and remove surface irregularities.
- Tamra foils gain flexibility and smoothness.
- Red-hot heating oxidizes the surface, followed by quenching, which cleans and brightens it.

b. Chemical Changes

- Impurities on the copper surface oxidize under heat and reduce during quenching in acidic media (e.g., Nimbu Svarasa or Nirgundi Svarasa).
- Acidic media react with toxic elements, neutralizing and eliminating harmful residues.
- Repeated cycles remove metal oxides and contaminants, leaving purified copper.

During Marana Process

a. Physical Changes

- Copper transforms from foil form into a fine powder (bhasma).
- Copper transitions to a dull, inert, and bio-available state.

- Repeated trituration with Parada, Gandhaka, and herbal pastes ensures uniform composition.

b. Chemical Changes

- Copper reacts with Parada (mercury) during trituration, forming copper amalgams.
- Copper reacts with Gandhaka (sulfur) under heat, forming copper sulfides.
- Repeated heating cycles oxidize and stabilize copper, converting it into a therapeutically safe form.
- High-temperature puta cycles ensure copper's conversion into microfine particles and bioavailable compounds.

Importance of Temperature While Processing

a. During Shodhana Process

- Controlled heating ensures impurities are oxidized and removed during quenching.
- Proper heat softens the copper, making it more pliable for handling.
- Avoids damage or material loss from excessive oxidation.
- Heating enables effective removal of toxins when immersed in acidic media.

b. During Marana Process

- Heat enables reactions with Parada (mercury) and Gandhaka (sulfur) to form amalgams and sulfides.
- High heat helps convert copper into fine particles (bhasma).
- Repeated heating ensures copper is converted to a stable, inert form suitable for therapeutic use.
- Prevents excessive oxidation and vaporization.

Yoga

1. Tamra parpati
2. Arogyavardhani rasa
3. Amavateshvara rasa
4. Nityananda rasa
5. Lakshmivilasa rasa
6. Hridayarnava rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Brief Review Of Tamra Bhasma (Calcined Copper) - A Metal Based Ayurvedic Formulation	Chandrashekhar Y. Jagtap, Department of RS & BK, IPGT & RA, Jamnagar-361008, Gujarat (India)	This paper provides a comprehensive review on Tamra Bhasma, covering its historical and modern perspectives, types, Grahya-agrahyatva, pharmacodynamic properties, Shodhana, Marana, and Amritikarana procedures, along with its dosage and formulations. The review aims to enhance existing knowledge and offer valuable insights for researchers in this field of study and research.
2.	Review of research works done on Tamra Bhasma (Incinerated Copper) at Institute for Post-Graduate Teaching and Research in Ayurveda, Jamnagar	Swapnil Y Chaudhari, PG Scholar, Department of Rasa Shastra and Bhaishajya Kalpana including Drug Research, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India	Eleven studies on Tamra Bhasma, conducted at Gujarat Ayurved University, confirmed its safety at Therapeutic Equivalent Dose (TED) levels, with no reported toxic effects. Somnathi Tamra Bhasma was found to be more effective than traditional Tamra Bhasma in pharmaceutical, pharmacological, and clinical aspects. Clinical trials showed positive results in conditions like Shvasa, Kasa, Yakrit Pliha Vriddhi, and Grahani, with symptom improvement. Despite some limitations, these studies provide a foundation for further research with larger sample sizes. No adverse effects were reported.
3.	Importance of Shodhana with Special Reference to Samanya Shodhana of Tamra	Archana Sahu, P.G. Scholar, Government Ayurved College, Raipur, Chhattisgarh, India.	The total weight loss of Tamra after Samanya Shodhana was 13.33%, indicating effective removal of impurities. Shodhana, a crucial process in Rasa Shastra, eliminates Doshas, which include both impurities and any elements that make the drug unsuitable for therapeutic use. Without proper purification, no medicinal substance can be prepared for therapeutic purposes. This principle holds true even for common substances like alum, which, when administered in impure form, may cause diseases, but when purified, provide remarkable therapeutic benefits.

Loha (Iron)

Introduction

- Loha (iron), symbolized as Fe (Latin: ferrum), is a vital metal in the Earth's structure and human advancement.
- Iron forms the Earth's core and is the fourth most abundant element in the crust.
- Ancient texts like the Vedas, Upanishads, and Puranas highlight Loha's cultural and practical significance.
- Early Ayurveda utilized Loha for cutting tools, utensils, and medicinal purposes, with references found in Charaka Samhita and Sushruta Samhita.
- Loha's use in formulations like Ayaskriti grew during classical Ayurvedic periods and advanced with Rasashastra, where its therapeutic potential was extensively studied.
- Loha remains a cornerstone of Ayurveda, celebrated for its enduring contributions to health and longevity.

Types

मुण्डं तीक्ष्णं तथा कान्तं लौहं त्रिविधमुच्यते।
मुण्डात्तीक्ष्णं ततः कान्तं प्रशस्तं परिकीर्तितम्।। (R.T. 20/1)

1. Munda loha
2. Tikshna loha
3. Kanta loha

Synonyms

1. Munda loha

मुण्डं तथा मुण्डलोहं कृषिलोहं शिलात्मजम्।
कृष्णायसं दृषत्सारमायसञ्च निगद्यते।। (R.T. 20/2)

Krishi Loha, Shilatmaja, Krishnayasa, Drishatsara and Ayasa.

2. Tikshna loha

लोहो लौहं लोहकञ्च शस्त्रलोहञ्च तीक्ष्णकम्।
सारलोहं काललोहं त्वयश्च तदिहोच्यते।। (R.T. 20/3)

Loha, Lauha, Lohaka, Shastra Loha (used to prepare sharp weapons), Tikshnaka, Saraloha, Kalaloha and Aya.

3. Kanta Loha

कान्तलोहं तथा कान्तं त्वयस्कान्तञ्च तन्मतम्।
कान्तायसं महालोहं तदेव विनिगद्यते।। (R.T. 20/4)

Kanta loha, Kanta, Ayaskanta, Kantayasa and Maha loha.

Mineralogical Identification

Properties	Identification
Chemical Name	Iron
Chemical Composition	Fe
Colour	Drak Grey, Black, Steel Grey
Cleavage	Prefect
Luster	Metallic
Streak	Grey
Specific Gravity	7.86
Hardness	4 – 5
Fracture	Hackly- Jagged
Transparency	Opaque

Sources

- Iron rarely exists in its pure, free form in nature. It is primarily found in various combined forms, such as oxides and carbonates.
- **Iron Deposits in India**:

  Major Indian states rich in iron resources include:
  - Bihar
  - Odisha
  - West Bengal
  - Madhya Pradesh
  - Uttar Pradesh
  - Punjab
  - Tamil Nadu
  - Karnataka
- **Global Iron Sources**

  Significant iron reserves are also found in several countries worldwide, including:
  - England
  - Germany
  - Japan
  - United States
  - Nepal
  - Bhutan
  - Afghanistan
- This widespread distribution underscores iron's importance as a global resource.

Grahya Lakhana

तीक्ष्णलोहस्य फलकान्यादाय भिषजां वरः।
रेतयेल्लोहकारैस्तच्चूर्णं शुद्ध्यै प्रयोजयेत्।। (R.T. 20/11)

1. When iron is heated to a red-hot state in a blacksmith's workshop and hammered intensely, fine iron particles or powder are produced.
2. Gather the iron powder (known as Tikshna Loha Churna) left behind during this process.
3. Only the powdered iron residue should be chosen for further purification (shodhana) procedures.

4. This specific form of iron powder is ideal due to its unique properties resulting from high-temperature heating and mechanical treatment.

Dosha

गुरुतादृढतोत्क्लेदः कश्मलं दाहकारिता ।
अश्मदोषः सदुर्गन्धो दोषाः सप्तायसः स्मृताः।।
(Ay.Pra. 3/223)

1. Guruta (heaviness in the body)
2. Dridhata (body stiffness)
3. Utkleda (nausea)
4. Kashmala (glani or tiredness)
5. Daha (burning sensation)
6. Ashmari (urinary calculi)
7. Durgandha (unpleasant body odour)

Asuddha & Apakva Loha Bhasma Sevanajanya Dosha

अशुद्धलोहं न हितं निषेवणादायुर्बलं कान्तिविनाशि निश्चितम्।
हृदि प्रपीडां तनुते ह्यपाटवं रुजं करोत्येव विशोध्य मारयेत्।।
(R.R.S. 5/146)

Ayu- Bala- Kanti Nasha, Hridya Shula, Krichchhra.

Treatment

मुनिरस पिष्ट विडङ्गं मुनिरस लीढं चिरं स्थितं घर्मे।
द्रावयति लोह दोषान् बह्निर्नवनीत पिण्डामिव।।
(Ay.Pra. 3/230)

Agastya Svarasa with Vai-Vidanga Churna and Aatapa Sevana.

Shodhana

Method 01

त्रिफलाऽष्टगुणे तोये त्रिफलाषोडशं पलम्।।
क्वाथ्यं पादावशेषे तु लोहस्य पलपञ्चकम्।
कृत्वा पत्राणि तप्तानि सप्तवारं निषेचयेत्।।
(R.Mr. 3/132-133)

1. Mix Triphala Yavakuta Churna and water in a 1:8 ratio.
2. Boil the mixture over a mild flame until it reduces to one-fourth.
3. Heat Tikshna Loha Churna in an iron ladle until red-hot.
4. Drop the red-hot iron powder into the Triphala Kvatha.
5. Retrieve and repeat with fresh decoction.
6. Perform the heating and quenching cycle seven times to obtain Shuddha Loha (purified iron).

Method- 02

सामुद्दलवणोपेतं तप्तं निर्वापितं खलु।
त्रिफलाक्वथिते नूनं गिरिदोषमयस्त्यजेत्।। (R.R.S. 5/104)

1. Triturate the required quantity of Saindhava Lavana (rock salt) with a small amount of water to form a thick paste.
2. Coat the thin Loha (iron) foils evenly with the prepared paste.
3. Allow the foils to dry completely.
4. Hold the dried foils using a Sandamsa Yantra (metal tongs).
5. Heat the foils over a high flame until they become red-hot.
6. Immediately immerse the red-hot foils into a vessel containing Triphala Kvatha.
7. Retrieve the foils, reapply the paste, and repeat the heating and quenching steps seven times to ensure thorough purification.
8. After the seventh cycle, collect the purified iron (Shuddha Loha) for further use.

Loha Paka

1. Bhanu Paka

विमलं खलु लौहन्तु सलिलक्षालितं भिषक्।
त्रिफलाक्वाथसंयुक्तं ततः खल्वे निधापयेत्।।
निदाघे तु निधायाथ भानोः प्रखरभानुभिः।
शोषयेद्भिषजां वर्यः कुर्यादेवं तु सप्तधा।।
भानुपाके लौहतुल्या त्रिफला द्विगुणं जलम्।
पादावशेषितञ्चाथ वराक्वाथं प्रयोजयेत्।। (R.T. 20/22-24)

Method of Bhanupaka: Triphala Kvatha is prepared by adding two parts of water and reducing it to 1/4 part of water. Loha is mixed with Triphala Kvatha and kept under sun till the fluid gets evaporated. This should be repeated 7 times.

2. Sthali Paka

भानुपाकविपक्वन्तु लोहं प्रक्षालयेदलम्।
ततः स्थाल्यां तु विन्यस्य चुल्लिकायां निधापयेत्।।
वराक्वाथेन सुपचेदतिवेलं खराग्निना।
शोषयेत्सलिलं यत्नाल्लौहकर्मविचक्षणः।।
स्थालीपाके त्रिगुणिता वरा षोडशिकं जलम्।
अष्टभागावशिष्टञ्च क्वाथमानं विधीयते।। (R.T. 20/26-28)

Method of Sthali Paka: Loha Churna ,a processed with Bhanupaka is washed with 48 parts of water and kept in a Sthali and 3 parts of Triphala Kvatha is added and heated on Tivragni till the moisture evaporates (Approx. 6 parts remaining).

3. Putapaka Method

रसादिभिर्भेषजानां खल्वे लौहं विमर्दितम्।
पुटस्थं पच्यते यस्मात् पुटपाकस्ततः स्मृतः।।
स्थालीपाकविपक्वन्तु लोहं प्रक्षालयेत्ततः।
यथादोषौषधोत्थेन रसेन क्वथितेन वा।।
लोहखल्वे सुसम्पेष्य चक्रिकाः कारयेत्ततः।
आतपे खलु संशोष्य मृच्छरावे तु विन्यसेत्।।
शरावेण पिधायाथ दृढं सन्धिं प्रलेपयेत्।
वनानीतैः करीषैर्वा ह्युत्पलैर्हस्तपिण्डितैः।।
पुटेद् गजपुटेनेह पुटपाकक्रियापटुः।
स्वाङ्गशीतं ततो ज्ञात्वा सम्पुटन्तु समाहरेत्।।
पुनः पूर्ववदेवेह दत्त्वा क्वाथोदकं पुनः।
सम्पेष्य सम्पुटे कृत्वा पुटेपुटविधानवित्।।
सहस्रवारमथवा शतवारमथापि वा।
षष्टिवारं पुटेद्वापि लौहं गुणविवृद्धये।।
गुणोदयो भवत्येवं पुटनादुत्तरोत्तरम्।
एवं पुटविपक्वन्तु लोहं सुमृतिमाप्नुयात्।।
पुटपाके वरादीनि यथादोषौषधानि तु।
लौहतुल्यानि गृह्णीयात् पुटपाककलापटुः।।
त्रिफलापुटितं लौहं सर्वत्र विनियोजयेत्।। (R.T. 20/31-39)

Puta: Gajaputa.

Method of Putapaka: Loha Churna ,a processed with Sthali Paka is washed with water and mixed with Triphala Kvatha and ground well. Thin flat chakrikas are prepared, dried and placed in Sharava Samputa.The Sandhi is sealed, dried and subjected to Gaja Puta.

Marana

Method 01

समगन्धमयचूर्णं कुमारीवारिभावितम्।
पुटीकृतं कियत्कालमवश्यं म्रियते ह्ययः।। (R.R.S. 5/123)

1. Mix equal quantities of shuddha tikshna loha churna and Shuddha Gandhaka churna in a clean khalva yantra and triturate until homogeneous.
2. Add Ghritakumari svarasa in equal quantity and triturate again to form a smooth paste.
3. Shape the paste into uniform chakrikas (pellets).
4. Dry the pellets under the sun.
5. Place the dried pellets in a Sharava Samputa and subject them to gajaputa (furnace heating) for 8 to 10 cycles.
6. The final product is loha bhasma (reddish iron ash).

Method 02

अथ पूर्वोदितं तीक्ष्णं वसुभल्लकवासयोः।
पुटितं पत्रतोयेन त्रिंशद्वाराणि यत्नतः।।
शोणितं जायते भस्म कृतसिन्दूरविभ्रमम्।। (R.R.S. 5/116)

1. Take Shuddha Tikshna loha churna in a clean Khalva yantra.
2. Subject the loha churna to one bhavana (levigation) each with required quantities of Shveta punarnava svarasa and vasa patra svarasa simultaneously.
3. After the bhavana, enclose the bhavita loha churna in a Sharava Samputa (perforated container).
4. Subject the enclosed loha churna to Gajaputa (furnace heating).
5. Repeat the process of bhavana and gajaputa for 30 cycles.
6. After the 30th gajaputa, the product obtained is the properly prepared loha bhasma, which should be red in color.

Dose

आरभ्य गुञ्जापादांशात् गुञ्जाद्वितयसंमितम्।
मृतं लौहं प्रयुञ्जीत प्राणाचार्यः प्रयत्नतः।। (R.T. 20/98)

Dose: 1/4th - 2 ratti (31 mgs - 250 mgs)

Anupana

त्रिफलामधुसंयुक्तं सर्वरोगेषु योजयेत्।
पथ्याशिनामयो भस्म यथोक्तगुणदं भवेत्।। (Ay.Pra. 3/228)

Triphala Churna or Triphala kvatha and Honey.

Properties

लौहं रूक्षं सुमधुरमलं पाकतश्चाथ तिक्तं वीर्ये शीतं गुरु च तुवरं लेखनञ्चातिनेत्र्यम्।
बल्यं वृष्यं जठरगदनुत् श्लेष्मपित्तामयघ्नं वर्ण्यं मेध्यं खलु किमधिकं हन्ति नानामयघ्नम्।। (R.T. 20/83)

- **Rasa**: Tikta, Kashaya
- **Guna**: Ruksha, Guru
- **Vipaka**: Madhura
- **Virya**: Shita
- **Dosha**: Vata- Pittahara
- **Karma**: Medhya, Varnya, Balaya

- **Therapeutic Uses**: Atisara, Shula, Amalapitta, Udararoga, Kamala, Pandu, Krimi, Medodosha, Prameha, Pliha Roga, Shotha, Shvasa, Kushtha.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Iron heats to red-hot and undergoes expansion.
- Repeated heating and quenching refine grain structure and improve malleability.
- Surface impurities and texture are visibly altered.

b. Chemical Changes

- Oxidation forms iron oxides, which dissolve during quenching.
- Triphala's tannins react with impurities, purifying the iron.
- Surface passivation reduces further oxidation.

During Marana Process

a. Physical Changes

- Mixing and triturating with Gandhaka and Ghritakumari Svarasa creates a uniform mixture.
- The paste is shaped into chakrikas (pellets), altering its form and facilitating uniform heating.
- Sun drying removes moisture, solidifying the structure.
- Gajaputa heating causes fragmentation and conversion into fine ash (bhasma).

b. Chemical Changes

- Repeated heating in the presence of air leads to oxidation, forming iron oxides.
- Gandhaka reacts with iron, forming iron sulfides or sulfates, depending on the heating conditions.
- The interaction between herbal juices, sulfur, and heat modifies the iron into its bhasma form.
- The process ensures the iron particles become non-toxic, bioavailable, and therapeutically active.

Importance of Temperature While Processing

- Ensures proper heating for impurity removal and structural improvement during Shodhana.
- Enables uniform oxidation and sulphur incorporation in Marana.
- Prevents vaporization of herbal components or incomplete reactions.
- Ensures fine particle formation for bioavailability.
- Activates therapeutic properties and ensures safety.
- Proper temperature ensures the effectiveness and medicinal quality of the final product.

Yoga

1. Loha parpati
2. Navayasa lauha
3. Dhatri lauha
4. Pradarantaka lauha
5. Saptamrita lauha
6. Arogyavardhini rasa
7. Candraprabha vati
8. Lohasava

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Applied Aspect of Lauha Shodhana and Its Importance	Dr. Sulochna P., P.G. Scholar Dep. of Ras Shastra & Bheshijya Kalpna At Rani Dullaiya Smt. Ayurved P.G. College and Hospital, Bhopal, MP.	Three methods of Shodhana (purification) for Loha (metal) are as follows: 1. **First Method:** Iron plates are steeped in hare's blood three times, then heated with intense heat (Tikshnagni) for purification (Rasa Ratna Samuchaya). 2. **Second Method:** Iron plates are coated with hare's blood and Calotropis latex, then heated and immersed in Triphala Kvatha three times (Yogaratnakara). 3. **Third Method:** 16 pala of Triphala is boiled with 8 times water, then the red-hot iron plates are immersed in the decoction seven times for purification. These methods demonstrate effective purification of Loha through multiple heating and immersion cycles.
2.	Pharmaceutical And Analytical Study on Loha Bhasma	Rajendraprasad ML	The study analyzed iron fillings, which were processed into Loha Bhasma using Samanya and Vishesha Shodhana procedures. Chemical analysis revealed: - Raw iron contained 96.82% iron, with only a 0.2% reduction after Shodhana. Following Banupaka and Sthali Paka, iron reduced by 2% and remained in Fe form. After Puta Paka, iron content was 89.48%, with no other metals present. Ash values: 98.24% total ash, 1.56% acid-insoluble, and 98.44% water-insoluble ash. The final Loha Bhasma contained iron in ferrous or oxide form, which is easily absorbed by the body, as confirmed by NPST showing fine particle size.

Sr.No.	Article Name	Author Name	Result
3.	Characterization of Lauha Bhasma	Bhargava Subhash Chandra, JR-III, Dept. of Rasa Shastra, Faculty of Ayurveda, Banaras Hindu University, Varanasi – 221005, U.P. India.	The study shows that Lauha Bhasma has minimal volatile substances, indicating its high quality. Tikshna Lauha transforms iron into Meghamite and Hematite, while Kanta Lauha (Magnetite) converts to higher oxide forms. Triphala's minor elements remain integral to the final Bhasma. Lauha Bhasma's high quality is affirmed by its minimal volatility and specific iron oxide transformations, with trace elements from Triphala retained in the Bhasma.

Mandura (Rust Iron)

Introduction

- Mandura, also known as the 'rust of iron', is chemically represented as Fe_2O.
- It is commonly referred to as red oxides formed through the reaction of iron with oxygen in the presence of water or air moisture.
- Rusting occurs when iron reacts with oxygen and water over time.
- Prolonged exposure to these elements causes iron to corrode completely, leading to disintegration.
- Unlike the protective patina layer that forms on copper surfaces, surface rust does not shield the underlying iron.
- Rust is fragile and offers no resistance to further corrosion.
- Rusting is the specific term for the corrosion of iron and its alloys, including steel.
- Other metals also corrode, but their oxides are not typically referred to as rust.

Synonyms

मण्डूरं तु समाख्यातं किट्टं लोहभवं तथा।
लोहकिट्टं लोहमलं लौहोच्छिष्टञ्च तन्मतम्।। (R.T. 20/124)

Kitta, Lohabhava, Lohakitta, Lohamala and Lauhochchhishta.

Mineralogical Identification

Properties	Identification
Chemical Name	Rust Iron
Chemical Composition	Fe_2O_3
Colour	Black
Cleavage	None
Luster	Dull
Streak	Black
Specific Gravity	3 – 3.8
Hardness	6 – 6.5
Fracture	Conchoidal
Transparency	Opaque

Types

According to Ayurveda Prakasha:

1. Munda Loha Kitta
2. Tikshna Loha Kitta
3. Kanta Loha Kitta

Grahya Lakshana

षष्टिवर्षीयमधमं मध्यं सप्ततिवार्षिकम्।
सर्वश्रेष्ठं समाख्यातं मण्डूरं शतवार्षिकम्।। (R.T. 20/125)

- Mandura aged 60 years is categorized as adhama
- Mandura aged 70 years is regarded as madhyama
- Mandura aged 100 years is esteemed as sarva-shrestha

Shodhana

Method 01

ध्मातं विभीतकाङ्गारैर्गोमूत्रे परिषेचितम्।
सप्तवारं लोहमलं शुद्धिमायात्यनुत्तमाम्।। (R.T. 20/127)

1. Use dry branches of the bibhitaki tree or glowing charcoal from the same plant to create an intense fire.
2. Place the mandura over the fire and heat it until it becomes red-hot.
3. Once heated, immerse the red-hot mandura in a vessel containing an ample quantity of cow's urine.
4. Repeat the process of heating the mandura red-hot and dipping it into the cow's urine seven times.
5. After completing all seven cycles, the shuddha mandura is ready for use.

Method 02

प्रखरदहनतप्तं लोहकिट्टं पुराणं विपुलसुरभिमूत्रे सप्तवारं निषिक्तम्।
निगदितविधियोगान्मारणायानुरूपां कलयति खलु शुद्धिं सत्वरं निर्विशेषाम्।। (R.T. 20/128)

1. Use glowing charcoal as the heat source for the purification process.

2. Place the mandura on the glowing charcoal and heat it until it becomes red-hot.
3. Carefully transfer the heated mandura into a vessel containing an adequate amount of cow's urine.
4. Repeat the cycle of heating the mandura red-hot and dipping it into the cow's urine a total of seven times.
5. After seven repetitions, the mandura is considered purified and ready for use.

Marana

कन्या रसेन तच्चूर्णं मर्दयित्वा पुटे पचेत्।
एवं सप्तपुटैर्भस्म मण्डूरस्य प्रजायते।। (R.Mr. 3/149)

1. Take the fine powder of purified mandura (shuddha mandura) and place it in a clean iron khalva yantra (mortar and pestle).
2. Add kumari svarasa (juice of Aloe vera) to the mandura powder and grind it thoroughly to ensure proper mixing.
3. Spread the mixture and dry it under the sun completely.
4. Place the dried material in a sharava samputa (a closed earthen container) for further processing.
5. Subject the enclosed material to one gajaputa (a high-temperature firing process).
6. Repeat the entire cycle of bhavana, drying, enclosing, and firing for a total of seven times.
7. After the seventh gajaputa, a properly prepared red-colored mandura bhasma is obtained, ready for use.

Dose

आरभ्यं गुञ्जापादांशाल्लोहमात्राविधानवित्।
गुञ्जाद्वितयपर्यन्तं मण्डूरं विनियोजयेत्।। (R.T. 20/135)

Dose: 1/4th – 2 Ratti (31 - 250 mgs)

Anupana

Triphala churna or Triphala kvatha, Honey, Milk, Ghee, Butter, Shuddha Shilajatu

Properties

मण्डूरं सुमृतं वृष्यं शिशिरं रुचिरं परम्।
दीपनं पित्तशमनं रक्तवृद्धिकरं परम्।।
पाण्डुप्रमत्तमातङ्गमदमर्दनकेशरी।
कामलाकुड्यकुलिशं मण्डूरं तु विशेषतः।।
शोषप्रशमनञ्चैव तथा शोफप्रणाशनम्।
हलीमकं च प्लीहानं मण्डूरं हन्त्यशेषतः।। (R.T. 20/132-34)

- **Rasa**: Kashaya, Madhura
- **Guna**: Ruksha, Laghu
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Pittakaphahara
- **Karma**: Vrishya, Ruchikara, Agnidipana.
- **Therapeutic Indications**: Pandu, Kamala, Shosha, Shopha, Haliamaka, Krimi, Arsha, Pleehavriddhi.

Probable Physico-Chemical Changes

a. During Shodhana Process

- **Physical Changes**: Thermal expansion, contraction, surface cleaning, and structural refinement.
- **Chemical Changes**: Oxidation of impurities, reduction by cow's urine, and removal of toxins in an alkaline medium.

b. During Marana Process

- **Physical Changes**: Powdering, drying, pellet formation, and fragmentation into fine ash.
- **Chemical Changes**: Oxidation to iron oxides, herbal infusion with Kumari Svarasa, and transformation into bioavailable, stable mandura bhasma.

Importance of temperature while Processing

a. During Shodhana Process

- Ensures Mandura reaches a red-hot state, loosening impurities and oxidizing toxic elements.
- Proper temperature promotes thermal shock, aiding in structural refinement and impurity removal.

b. During Marana Process

- High temperatures oxidize iron into bioavailable iron oxides (Fe_2O_3 and Fe_3O_4).
- Heat allows proper infusion of Kumari Svarasa, embedding therapeutic properties into the bhasma.
- Controlled heat during gajaputa aids in fragmentation of iron particles into fine, bio-available ash.

- Consistent high temperature ensures even heating, preventing incomplete reactions and ensuring uniform quality.
- Proper temperature neutralizes toxic elements, stabilizing the bhasma for safe medicinal use.

Yoga

1. Shatavari mandura
2. Triphala mandura
3. Punarnava mandura
4. Mandura vataka

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	An Analytical Review on Mandura Bhasma in Classics	Uthamsha, PG Scholar from Govt Ayurveda College, Trivandrum, Karala.	Classical texts state that Mandura, after proper Shodhana (purification), is therapeutically useful, especially for liver disorders. Analysis shows Mandura contains iron and silica, aiming to reduce silicates and increase iron oxide. Standards suggest ≥30% iron and silica, ≤80% fayalite, with arsenic and cadmium within specified limits.
2.	Analytical Standardization of Mandura Bhasma	Kishore Kumar H, PG Scholar, Department of Rasa Shastra and Bhaishajya Kalpana, S. V. Ayurvedic College, Tirupati, A.P. India.	Mandura Bhasma was analyzed using techniques like XRD, SEM, EDS, PSA, Zeta Potential, UV-Spectroscopy, and FTIR. XRD identified major Fe_2O_3 and minor K_2SO_4 peaks. SEM showed irregular rhombohedral particles, and EDS confirmed elements Fe (38.09%), O (29.38%), Ca (0.40%), and K (0.52%). The particle size was 3.2 nm with a Zeta Potential of -32.7 mV. UV-spectroscopy showed peak absorption at 300 nm, and FTIR displayed 26 peaks, indicating complete transformation of raw Mandura into a compound form without free elemental traces.
3.	A Review of Literature on Punarnavadi Mandura: An Ayurvedic Herbo-Mineral Preparation	Dr Janmejaya Samal, C/O-Mr Bijaya Ketan Samal, At-Pansapalli, Po-Bangarada, Via-Gangapur, Dist-Ganjam, PIN-761123, Odisha, INDIA. Email: janmejayasamal@yahoo.com	A literature search on "Punarnavadi Mandura" yielded 33 sources, with 5 key studies reviewed. Three studies highlighted its efficacy for iron deficiency anemia (IDA) across all ages, showing significant improvements in hematological parameters. Additional research demonstrated its benefits in Diabetic Nephropathy (DN) as a Naimithika Rasayana. Punarnavadi Mandura, included in ASHA drug kits, is essential in India's National Health Program for managing IDA, especially in rural areas where the condition is prevalent.

Vanga (Tin)

Introduction

1. The term Vanga historically refers to Bengal, reflecting its origins as a metal imported into India from Southeast Asia through Bengal's ports via sea routes.
2. This nomenclature evolved from the association of the metal's supply with the region, transitioning from Banga to Vanga.
3. Vanga boasts a significant historical presence, with mentions in ancient texts such as the Vedas, Upanishads, and Puranas.
4. Its medicinal applications date back to the Samhita Kala period.
5. Classical texts like the Charaka Samhita and subsequent Ayurvedic scriptures frequently reference Vanga.
6. The development of Rasashastra expanded its use, including studies on its toxicity and therapeutic benefits.

Synonyms

वङ्गञ्च वङ्गकं रङ्गं रङ्गकं शुक्लोहकम्।
कुरूप्यं त्रपुसञ्चैव त्रपुषं त्रपु कीर्तितम्।। (R.T. 18/1)

Vanga, Vangaka, Ranga, Rangaka, Shuklaloha, Kurupya, Trapusa, Trapusha and Trapu.

Mineralogical Identification

Properties	Identification
Chemical Name	Tin
Chemical Composition	Sn
Colour	Greyish White
Cleavage	Indistinct
Luster	Metallic
Streak	Grey White
Specific Gravity	7.31
Hardness	2
Fracture	Malleable
Transparency	Opaque

Sources

1. Tin ranks as the 49th most abundant element in the Earth's crust, with a concentration of 2

ppm, in contrast to zinc (75 ppm), copper (50 ppm), and lead (14 ppm).

2. Unlike some metals, tin is not found in its native form and must be extracted from various mineral ores.
3. Major global tin deposits are located in regions such as southern Mongolia, Colombia, South America, Australia, South Africa, China, Siberia, and Malaysia.
4. In India, significant tin reserves are found in Bihar.
5. Cassiterite (SnO_2) is the primary ore mined for commercial tin production, with minor contributions from complex sulfides like stannite, cylindrite, franckeite, canfieldite, and teallite.
6. Tin-bearing minerals are commonly associated with granite formations, typically containing around 1% tin oxide.

Types

खुरकं मिश्रकं चेति वङ्गकं द्विविधं मतम्।
खुरकं श्रेष्ठमाख्यातं मिश्रकं त्ववरं परोप्तम्। (R.T. 18/2)
खुरकं मिश्रकञ्चेति द्विविधं वङ्गमुच्यते।
खुरं तत्र गुणैः श्रेष्ठं मिश्रकं न हितं मतम्।। (R.R.S. 5/153)

There are two types of vanga specified in classics;

1. Khuraka vanga (Shreshtha)
2. Mishraka vanga (Avara)

Grahya Lakshana

मृदुलं निर्मलञ्चैव चन्द्रलोहसमप्रभम्।
द्रुतद्रावञ्च निःशब्दं खुरकं समुदीरितम्।। (R.T. 18/3)

1. Khuraka Vanga is recognized for its softness and cleanliness.
2. It possesses a bright, silver-like shine, often referred to as Chandra Loha.
3. It melts quickly and abruptly upon reaching its melting point.
4. Unlike many metals, it produces no sound (Nishabda) during the melting process.

Agrahyata Lakshana

(Mishraka Vanga-Svarupa)

दावेऽतिकठिनं रूक्षं त्वन्यधातुविमिश्रितम्।
धूसरं कठिनञ्चैव मिश्रकं वङ्गमुच्यते।। (R.T. 18/4)

1. The type of vanga (tin) being described has a high melting point and does not melt easily.
2. It features a rough and uneven exterior surface, distinguishing it from pure tin.
3. The material exhibits a dhusara (greyish) hue and is notably hard compared to ordinary tin.
4. These characteristics are indicative of tin (vanga) that is alloyed with other metals.
5. Such a composition is referred to as mishraka vanga due to the presence of mixed metals.

Doshas

अशुद्धममृतं वङ्गं प्रमेहादिगणप्रदम्।
गुल्म हृद्रोग शूलार्शः कासश्वासवमिप्रदम्।। (Ay.Pra. 3/154)

Prameha, Gulma, Hridroga, Shula, Arsha, Shvasa and Vamana.

Treatment

मेषशृङ्गीसितायुक्तां यः सेवेत दिनत्रयम्।
वङ्गदोषविमुक्तोऽसौ सुखं जीवति मानव।। (Br.R.R.Su., p. 78)

Meshashringi with sita for 3 Days.

Shodhana

Method- 01

खुराभिधानं खलु शुक्ललोहं निधाय दर्व्यां भिषजां वरेण्यः।
चुल्लीगतञ्चाप्यथ गालयित्वा विशुद्धचूर्णोदकपूर्णगर्भे।।
गाढन्तु सच्छिद्रपिधानकेन क्षिपेत्समाच्छन्नमुखे तु कुम्भे।
इत्थं निषिक्तं भिषजाश्चवारं वङ्गं विशुद्धिं समुपैति नूनम्।। (R.T. 18/8-9)

1. Take Ashuddha Vanga and place it in a clean, larger-sized iron tablespoon.
2. Hold the tablespoon over a fire and heat it until the tin completely melts and prepare a vessel containing churnodaka (limewater).
3. Using a pidhanaka yantra (a filtering device), pour the molten tin carefully into the limewater.
4. Allow the molten tin to solidify in the limewater and retrieve the solidified tin from the vessel.
5. Melt the tin again and pour it into fresh limewater.
6. Repeat this process of melting and pouring into new limewater seven times.
7. With each repetition, note the brightening appearance of the tin, indicating its purification.
8. After completing seven cycles, dry the Shuddha Vanga.

9. Store it appropriately for further pharmaceutical applications.

Method 02

वङ्गकं गालितं लोहदर्वीगतं सूर्यदुग्धे भृशञ्चैव निर्वापयेत्।
पूर्वमार्गेण वै शेषकर्माचरेत् सत्वरं वङ्गकं याति शुद्धिं पराम्।। (R.T. 18/10)

1. Place impure tin (Ashuddha Vanga) in a clean iron tablespoon.
2. Heat the tin over fire until it melts completely.
3. Pour molten tin through a pidhanaka yantra into a vessel containing fresh arka dugdha (calotropis milk).
4. Collect and remelt the solidified tin, then pour it into fresh arka dugdha. Repeat this process seven times.
5. Note the increasing brightness of the tin with each cycle.
6. After the seventh cycle, dry the purified tin (Shuddha Vanga) and store for pharmaceutical use.

Jarana

शुद्धं वङ्गं क्षिपेद्भृण्ड्यां चुल्लिस्थायां शनैः शनैः।
तदधो ज्वालयेदग्निं दुते वङ्गे क्षिपेत्पुनः।।
अपामार्गं चतुर्थांशं चूर्णं सञ्चालयेदिदम्।
स्थूलाग्रया ह्ययोदर्व्या यावत्तद्भस्म जायते।।
चूर्णप्रक्षेपणं कार्यं स्वल्पं स्वल्पं मुहुर्मुहुः।
यावद्भस्मं भवेद्वङ्गं तावच्चूर्णं समापयेत्।।
शरावपिहितं पश्चात् स्थापयेत्तत्र तद्भिषक्।
रजः सर्वं ततोऽधस्तात्कुर्यादग्निं तु तीव्रकम्।।
यावद्वङ्गारवर्णं तद्रजः समुपजायते।
स्वाङ्गशीतं ततो ग्राह्यं मारणाय रजः शुभम्।। (Ay.Pra. 3/155-159)

1. Take one part of Shuddha Vanga (purified tin) in a wide-mouthed iron vessel (kadhahi).
2. Place the vessel over intense fire and heat until the tin melts completely.
3. Gradually add one-quarter part of Apamarga Churna (powder of Achyranthes aspera) in small amounts.
4. Rub the mixture thoroughly with the base of a larger iron spoon.
5. Continue this process until all the Apamarga Churna is added.
6. The tin gradually transforms into bhasma (fine powder form) during the process.
7. Heap the bhasma in the center of the vessel.
8. Cover it with an inverted mud lid (mrit-sarava).
9. Subject the vessel to intense heat for an entire day.
10. Lift the mud lid and inspect whether the Vanga Bhasma appears reddish, resembling fire.
11. If the reddish hue is observed, stop heating and allow the vessel to cool naturally.
12. Once cooled, collect the fine reddish powder from the vessel.
13. This powder, called Jarita Vanga, is ready for incineration.

Marana

Method-01

अथ भस्मसमं तालं क्षिप्त्वाऽम्लेन विमर्दयेत्।
ततो गजपुटे पक्त्वा पुनरम्लेन मर्दयेत्।।
तालेन दशमांशेन याममेकं ततः पुटेत्।
एवं दशपुटैः पक्वं वङ्गं भवति मारितम्।। (Ay.Pra. 3/179-180)

1. Take all the ingredients as required.
2. First, triturate Vanga Jarita and Shuddha Haritala triturated.
3. Add Nimbu Svarasa as marana drava dravya for one day.
4. Form thin, flat chakrikas and dry them under the sun.
5. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
6. 2nd time Obtained Ist puta product add 1/10th part of Shuddha Haritala and triturated with Nimbu Svarasa.
7. Then, administer Gaja Puta. This process is done by ten times. If more putas are needed, repeat this process until the bhasma passes the bhasma pariksha.

Method-02

स्वरसेन कुमार्यास्तु वर्याः क्षीरसरेण वा।
विमर्द्य चक्रिकाः कृत्वा हार्धेभाग्ध्ये पुटे पचेत्।।
एवं सप्तपुटैर्वङ्गं मृतं भवति निश्चितम्। (R.Mr. 3/94½)

1. Take all the ingredients as required.
2. First, triturate Jarita Vanga with Kumari Svarasa for one day.
3. Form thin, flat chakrikas and dry them under the sun.
4. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa.

5. Then, administer Ardha Gaja Puta.
6. Repeat this process until the bhasma passes the bhasma pariksha.

Dose

रक्तिकात: समारभ्य रक्तिद्वितयसम्मिताम्।
पूर्णमात्रां प्रयुञ्जीत मृतवङ्गस्य कोविद:।। (R.T. 18/46)

Dose : 1 - 2 ratti (125 mgs - 250 mgs)

Anupana

Guduchi Svarasa, Honey, Ghee, Haridra Rasa.

Properties

वङ्गं मृतं लघु सरं शिशिरञ्च रूक्षं मेध्यं सतिक्ततुवरं लवणञ्च किञ्चित्।
मेदोहरं रुचिकरञ्च रसायनञ्च श्लेष्मामयप्रशमनं खलु सम्प्रदिष्टम्।।
वङ्गं वान्तिहरं परं व्रणहरं सर्वप्रमेहामहं चक्षुष्यं सुमतिप्रदं क्षयहरं शुक्रैकसंवर्द्धनम्।
श्वेतासृग्दरनाशनं व्रणहरं जन्त्वामयध्वंसनं कामं कामविवर्धनं धृतिकरं वर्ण्यं निकामं तथा।।
वङ्गं कामं मदनजननं स्वप्नमेहामयघ्नं कासश्वासप्रशमनपटु प्रीणनं कार्श्यभाजाम्।
वृष्यं बल्यं पवनशमनं पाण्डुहृच्चातिवेलं वाग्जालैः किं भवति नितरां सौख्यप्रदं देहभाजाम्।।
गर्भाशयच्युतिहरं श्वासकृच्छ्रप्रणाशनम्।
शोषोद्भूतनिशास्वेदोल्बणश्लेष्महरं परम्।। (R.T. 18/39–42)

- **Rasa**: Tikta, Kashaya and Lavana.
- **Guna**: Laghu, Shita
- **Virya**: Ushna
- **Vipaka**: Katu
- **Karma**: Dipana, Chakshushya, Rasayana, Vajikarana, Krimighna, Ayushya, Shukrala.
- **Therapeutic Uses**: Kasa, Shvasa, Kapharoga, Medodosha, Prasveda, Kshaya, Pandu, Krimi, Prameha, Garbhashayachyuti, Shveta Pradara, Raktapradara, Agnimandya, Aruchi, Buddhimandata, Vrana, Svapnadosha.

Probable Physico-Chemical Changes

During the Shodhana Process

a. Physical Changes

- The tin transitions between molten and solid states, aiding in impurity separation.
- With each cycle, the tin's surface becomes brighter, reflecting improved purity.
- Unwanted particles detach during filtration through limewater.

b. Chemical Changes

- Limewater (calcium hydroxide solution) reacts with impurities, neutralizing and dissolving them.
- Exposure to air during melting may oxidize certain impurities, which are then removed during quenching.
- Repeated cycles result in the removal of chemical contaminants, stabilizing the tin.

During Marana Process

a. Physical Changes

- Vanga and other ingredients are triturated, shaped into thin chakrikas, and dried, enhancing uniform heat distribution.
- Repeated heating and cooling cycles (Gaja Puta) break down the Vanga into finer particles, eventually forming bhasma.
- The material progressively changes to a uniform, soft, and ash-like consistency, indicating complete incineration.

b. Chemical Changes

- High-temperature heating converts metallic Vanga into oxides, making it bioavailable.
- The addition of Shuddha Haritala (arsenic sulfide) facilitates chemical reactions that enhance the purification and transformation of Vanga.
- The acidic medium (citric acid) helps dissolve impurities, aiding in chemical transformation and stabilization.
- Toxic elements are neutralized or transformed into non-toxic compounds through heat and repeated reactions.
- Through repeated Gaja Putas, the Vanga transforms into a stable, non-toxic, therapeutically potent form, suitable for medicinal use.

Importance of Temperature while Processing

Shodhana

- Heating the tin until it melts allows impurities to separate.
- The process of melting and solidifying in lime-water (Churnodaka) is repeated seven times, with the temperature ensuring complete melting and purification.

- The brightening of tin with each cycle indicates successful purification.

Marana

- In the calcination process, tin is heated in Gaja Puta (furnace) with acidic substances like Nimbu Svarasa.
- Proper heat ensures the conversion of tin into fine Bhasma, while overheating can lead to unwanted reactions or loss of potency.
- Temperature control is essential for achieving pure and effective Bhasma.

Yoga

1. Talakeshvara rasa
2. Indu vati
3. Kshayakesari rasa
4. Svarna vanga
5. Trivanga bhasma
6. Lakshmivilasa rasa
7. Vangashtaka rasa
8. Nityananda rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Vanga in Ayurveda - A Literary Review	Parween Bano, Ph.D Scholar, Department of Rasashastra & Bhaishajya Kalpana, National Institute of Ayurveda, Jaipur, Rajasthan, India	This study emphasizes that the Rasopanisada, a classical text on alchemy, places great importance on the alchemical power of Vanga (tin), stating it surpasses other metals in potency. Ananda Kanda (12th century) and Rasendra Chudamani (12th–13th century) elaborate on the types of Vanga, its purification (Shodhana) and incineration (Marana) processes, therapeutic properties, and recommended dietary regimen (Pathya Ahara) during its use. Rasa Prakash Sudhakar (12th–13th century) asserts that Vanga Bhasma can treat 80 types of Vatavyadhi (neuromuscular disorders) and 20 types of Prameha (metabolic disorders). Detailed discussions on Vanga are also provided in Rasendra Chudamani and Rasaratna Samuchaya (13th century).
2.	Analytical study of Vanga Bhasma	Piyush Chaudhary, Astt. Professor, Deptt. of Rasa Shastra, Dayanand Ayurveda College, Jalandhar, Panjab	This study confirms that Bhasma, used in Ayurveda for centuries, consists of nano-sized particles. Vanga Bhasma is an organometallic compound with a Sn-C bond and tin oxide (SnO_2) as the primary phase. Its preparation introduces essential microelements from the herbal ingredients used in Bhasma nirman, benefiting the body.
3.	Vanga Bhasma And Its XRD Analysis	Dr. Rudramma Hiremath	Metallic preparations offer advantages over plant-based drugs, including long-term stability, lower dosing, and easier storage. XRD analysis of Samanya and Vishesha Shodhita Vanga shows untransformed tin, suggesting minimal structural change during Shodhana. Trace elements in Vanga Bhasma, from the preparation medium, may enhance its potency. Apamarga (rich in potash) reacts with tin, forming compounds. During Jarana (roasting), tin oxidizes in the presence of heat, producing SnO and $K_2Sn_2O_3$. Further processing with Kumari (Aloe vera) at 600°C fully transforms Jarita Vanga, creating stable compounds in Vanga Bhasma without free metallic tin, as shown by XRD.

Naga (Lead)

Introduction

- Naga, historically associated with lead (Sisaka), has deep roots in Indian tradition, with mentions in the Vedas, Upanisads, and Puranas.
- Its medicinal applications date back to the Samhita Kala, as referenced in Charaka Samhita.
- With the rise of Rasashastra, its properties, toxicity, and therapeutic uses were extensively explored.
- Geologically, lead forms during volcanic eruptions, flowing with molten zinc, silver, and copper through rocky fissures before solidifying.
- This bluish-white metal, turning dull grey upon oxidation, resembles a cobra emerging from rocks, inspiring the name "Naga," meaning snake.
- This symbolism and its medicinal significance cement Naga's legacy in traditional medicine.

Synonyms

सीसकं शीषकं सीसं नागकं नागनामकम्।
कुवङ्गकं कुरङ्गञ्च तथा सिन्दूरकारणम्।। (R.T. 19/1)

Sisaka, Shisaka, Sisa, Nagaka, kuvangaka, Kuranga and Sindurakarana.

Mineralogical Identification

Properties	Identification
Chemical Name	Lead
Chemical Composition	Pb

Properties	Identification
Colour	Lead Grey
Cleavage	None
Luster	Metallic
Streak	Grey
Specific Gravity	11.37
Hardness	1.5
Fracture	Hackly
Transparency	Opaque

Sources

- Metallic lead occurs naturally, though it is a rare phenomenon.
- Lead is commonly associated with ores containing zinc, silver, and copper, which are extracted together with lead.
- In India, lead deposits are found in regions such as Kashmir, Punjab, Rajasthan, Bihar, and Tamil Nadu.
- Globally, lead ores are located in countries like the United States, Australia, and Mexico.
- The primary lead ore, Galena (PbS), comprises 86.6% lead by weight.
- Other notable lead ore varieties include:
  - Cerussite (Lead carbonate, $PbCO_3$)
  - Anglesite (Lead sulphate, $PbSO_4$)
  - Matlockite (Lead chloride, PbClF)
  - Litharge (Lead oxide, PbO)

Types

नागं च द्विविधं प्रोक्तं कुमारं समलं तथा।
कुमारं रसकार्येषु योजनीयं गुणाधिकम्।।

(Br.R.R.Sun., p. 80)

Naga will be of two varieties;

1. Kumara Naga- useful for therapeutic purpose.
2. Samala Naga

Grahya Lakshna

सुगौरवं मृदु स्निग्धं छेदने मलिनोज्ज्वलम्।
बहिःश्यामं दुतद्रावं सीसकं जात्यमादिशेत्।। (R.T. 19/2)

1. Lead (Pb) is a heavy, soft, and smooth metal.
2. When cut, it reveals a dull yet shiny inner surface with a blackish color.
3. It melts sharply upon reaching its melting point, indicating its purity.
4. This specific type of lead is considered the highest quality.
5. Such lead is ideal for use in pharmaceutical and therapeutic applications.

Agrahyata Lakshna

बहिः शुक्लं भारहीनं रूक्षं छेदे च निष्प्रभम्।
समलं कठिनद्रावं सीसकं हेयमादिशेत्।। (R.T. 19/3)

1. Lead (Pb) with a whitish exterior surface and a lightweight structure is unsuitable for certain applications.
2. When cut, it lacks a shiny inner surface and appears dull and dirty.
3. This type of lead melts with difficulty, indicating inferior quality.
4. Such lead is not recommended for pharmaceutical or therapeutic purposes.

Doshas

अशुद्धः कुरुते नागः प्रमेहक्षय कामलाः।
तस्मात्संशुद्ध एवायं मारणीयो भिषग्वरैः।।
पाकेन हीनौ किल नागवङ्गौ कुष्ठानि गुल्मांश्च तथाऽतिकष्टान्।
पाण्डुप्रमेहानलसादशोथ भगन्दरादीन् कुरुतः प्रयुक्तौ।।

(Ay.Pra. 3/188-189)

Ashudha: Prameha, Kshaya and Kamala.

Apakva: Kushtha, Gulma, Pandu, Prameha, Agnimandya and Bhagandara.

Treatment

अविशुद्धामृताद्युत्थविकारपरिशान्तये।
विशुद्धगन्धं चूर्णन्तु योजयेद् भिषजां वरः।। (R.T. 19/93)

Shuddha Gandaka Churana

Shodhana

सीसकं द्रावयेल्लोहदर्वीगतं स्वच्छचूर्णोदके चाथ निर्वापयेत्।
पूर्वमार्गेण वै शेषकर्माचरेत् सीसकं सत्वरं याति शुद्धिं पराम्।।

(R.T. 19/10)

1. Take a clean, large iron tablespoon.
2. Place the unpurified lead (Ashuddha Naga) in the spoon.
3. Hold the spoon over a fire and heat until the lead melts completely.
4. Pour the molten lead into a vessel containing limewater (Churnodaka) using a Pidhanaka Yantra (a pouring apparatus).

5. Collect the solidified lead from the limewater and melt the collected lead again.
6. Repeat the process of melting and pouring the lead into fresh limewater seven times.
7. Once purified, dry the lead thoroughly.
8. Store the purified lead (Shuddha Naga) for further pharmaceutical use.

Marana

तत्तुल्यां च मनःशिलाम्।।
काञ्जिकेन द्वयं पिष्ट्वा पचेद् दृढपुटेन च।
स्वाङ्गशीतं पुनः पिष्ट्वा शिलया काञ्जिकेन च।।
पुनः पुटेच्छरावाभ्यामेवं षष्टिपुटैर्मृतिः।

(Sha.S.M.Kha. 11/38-39)

1. Take all the ingredients as required.
2. First, triturate Jarita Naga and Shuddha Manahshila is triturate well.
3. Add with Kanjika as mardana drava dravya and triturate it properly.
4. Form thin, flat chakrikas and dry them under the sun. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Puta.
5. From the 2nd process shuddha manahshila is added only 1/4th part. Repeat this process until the bhasma passes the bhasma pariksha.

Dose

पादांशतो रक्तिकाया रक्तिकैकमितं शुभम्।
मृतं सीसं प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 19/46)

Dose : 1/4th – 1 Ratti (31 mgs – 125mgs)

Anupana

Haridra Svarasa, Jambu Svarasa

Properties

मृतन्तु सीसं मधुरञ्च तिक्तं स्निग्धं तथोष्णं गुरु लेखनञ्च।
सरं तथा वह्निविवर्द्धनञ्च रसागमज्ञैः खलु सम्प्रदिष्टम्।।

(R.T. 19/43)

प्रमेहकरिकेशरी पवनरोगकालानलः ग्रहण्यतिनिशारुणः खलु गुदाङ्करेभाङ्कुशः।
बलासगदतस्करो व्रणगणौकसङ्कर्षणः परं विजयतेतरां गदहरो भुजङ्गा मृतः।। (R.T. 19/44)
नागस्तु नागसमतां दुतमातनोति गुल्मद्विपं दलयतीह चिरप्रमत्तम्।
घोरं हरेत्प्रदरमाशु हि रक्तपूर्वं तूर्णन्तु रोगनिर्वहान् विनिहन्ति नूनम्।। (R.T. 19/45)

- **Rasa:** Madhura, Tikta.
- **Guna:** Snigdha, Ushna, Guru, Lekhana, Sara.
- **Virya:** Ushna.
- **Karma:** Dipana, Pachana, Krimighana, Vajikarana, Rasayana, Ayushaya.
- **Therapeutic Uses:** Atisara, Grahani, Gulma, Arsa, Prameha.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Melting and solidification refine the structure and remove visible impurities.
- Repeated heating and quenching improve uniformity.

b. Chemical Changes

- Oxidation and reaction with limewater remove toxic impurities like arsenic and antimony.
- Formation of insoluble compounds neutralizes contaminants.

During Marana Process

a. Physical Changes

- Trituration and formation of thin chakrikas ensure uniformity and effective heat exposure.
- Repeated incineration modifies the material's crystalline structure.

b. Chemical Changes

- Oxidation and reaction with Manahshila (realgar) produce stable lead compounds.
- Toxicity is reduced, yielding bio-compatible Bhasma, verified through Bhasma Pariksha.

Importance of Temperature While Processing

a. During Shodhana Process

- **Melting Point Utilization:** Heating lead (Naga) to its melting point (~327.5°C) ensures the removal of physical and chemical impurities.
- **Preventing Overheating:** Excessive heating can cause oxidation of lead to toxic forms or evaporation, leading to material loss and reduced quality.
- **Facilitating Reactions:** Controlled temperature allows effective interaction with limewater (Churnodaka), aiding in the removal of arsenic, antimony, or other contaminants.

b. During Marana Process

- **Controlled Oxidation:** Sustaining the correct temperature during Puta ensures lead

transitions into stable oxides and sulfides essential for Bhasma formation.

- **Avoiding Toxic Byproducts**: Overheating can lead to the production of undesirable compounds or toxic vapors.
- **Uniform Heat Distribution**: Proper temperature ensures even heating of the chakrikas, allowing homogeneous chemical transformation.
- **Stepwise Conversion**: Gradual temperature increase facilitates phase transitions necessary for producing fine, non-toxic, and absorbable Bhasma.
- **Bhasma Quality**: Consistent heating ensures the end product passes Bhasma Pariksha (tests for fineness, floatability, and safety).

Yoga

1. Ratnagarbha-pottali rasa
2. Suchikabharana rasa
3. Trailokyachintamani rasa
4. Manikya rasa
5. Kshayakesari rasa
6. Jvarari rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pharmaceutical Standardization Of Naga Bhasma (Incinerated Lead) Prepared By Using Herbal Media	Dhirajsingh S Rajput, Ph.D. Scholar, Dept. of Rasa shastra and Bhaishajya Kalpana, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.	This study standardizes Naga Bhasma, an Ayurvedic incinerated lead known for antidiabetic and aphrodisiac properties, using Vasa (Adhatoda vasica) as herbal media. Prepared Bhasma underwent Ayurvedic tests and physico-chemical analysis. The 28-day process, with a 3.76% weight loss, highlights Jarana (roasting) as crucial for optimizing reactivity.
2.	A Brief Review of Naga (Lead) Through Ayurvedic Literature	B.J. PATGIRI, Department of RS & BK, I.P.G.T. & R.A., Gujarat Ayurveda University, Jamnagar-361 008 Gujarat (India)	This study provides a detailed review of Ayurvedic literature on Naga Bhasma (incinerated lead), including Shodhana, Jarana, Bhavana, and Marana methods, as well as research on its safety. Naga Bhasma is found to be a mixture of PbO and Pb3O4, containing OH, (CO3)2, (SO4)2, and (AsO4)3 groups. Toxicity studies show it is non-toxic, while its testicular regenerative studies confirm its aphrodisiac properties. This research offers insights into Naga Bhasma's pharmaceutical processes, chemical composition, and safety.

Yashada (Zinc)

Introduction

- Yasada has a longstanding history under the name Kharpara Sattva.
- References to Kharpara Sattva are found as early as the 10thcentury text Rasarnava.
- In ancient Rasa literature, Yasada is also identified by terms such as Ritikrita and Tamra Ranjaka.
- During the era of Muslim dynasties, the name Yasada emerged, influenced by the Arabic term Jasta.
- The 15th century text Madanapala Nighantu was the first to record the term Yashada.
- Adhamalla, a commentator on the Sharngadhara Samhita, classified this substance under the Dhatu Varga category.
- The Ayurveda Prakasha author provided the first detailed discourse on this substance.
- In modern times, Yashada has been extensively studied for its toxicological properties and continues to be used in medicinal applications.

Synonyms

यशदं यसदञ्जैव जशदं जसदं तथा।
रीतिहेतुः खर्परजं समाख्यातं भिषग्वरैः।। (R.T. 19/94)
यशदं रङ्गसङ्काशं रीतिहेतुश्च तन्मतम्।। (Ay.Pra. 3/181)

Yashada, Yasada, Jashada, Ritihetu, Kharparaja and Rangasankasha.

Mineralogical Identification

Properties	Identification
Chemical Name	Zinc
Chemical Composition	Zn
Colour	Blue Grey
Cleavage	Perfect
Luster	Metallic
Streak	Light Grey
Specific Gravity	6.9 – 7.2
Hardness	2

Properties	Identification
Fracture	Brittle
Transparency	Opaque

Sources

- The largest reserves of mineable zinc are located in Australia and the United States.
- In India, significant deposits are found in states such as Bihar, Rajasthan, Punjab, Kashmir, Madhya Pradesh, and Tamil Nadu.

Grahya Lakshana

छेदे समुज्ज्वलं स्निग्धं मृदुलं निर्मलं तथा।
दुतद्रावं महाभारं यशदं ग्राह्यमुच्यते।। (R.T. 19/95)

- Zinc with a shiny interior surface upon cutting is considered ideal.
- It should be smooth (Snigdha), soft (Mridu), and free from impurities.
- The metal must melt sharply and quickly upon reaching its melting point.
- A heavy sample of zinc meeting these criteria is classified as Grahya Yashada.

Agrahyata Lakshana

कठिनं कठिनद्रावं रूक्षं रूक्षप्रभं लघु।
तदग्राह्यं मलिनं यशदं यत्तु तदग्राह्यं प्रकीर्तितम्।। (R.T. 19/96)

- Zinc that is hard and melts with difficulty is deemed unsuitable.
- A rough Ruksha texture and a dull or lackluster appearance indicate inferior quality.
- Lightweight and unclean zinc is also considered substandard.
- Such a sample is classified as Agrahya Yashada and is not used for therapeutic purposes.

Doshas

विशुद्धिहीनं यशदं मृतञ्जेद् विशोधितं वाप्यमृतं त्वविज्ञैः।
निषेवितं वै जनयेद् विकारान् गुल्ममेहक्षयकुष्ठकादीन्।।
(R.T. 19/97)

Gulma, Prameha, Kshaya and Kushtha

Treatment

बलाभयां सितायुक्तां सेवते यो दिनत्रयम्।
यशदस्य विकारस्तु शान्तिमायतिनान्यथा।।
(Bri.R.Raj.Sun., p. 80)

Bala, Haritaki and Sharkara taken for 3 days.

Shodhana

Method 01

जात्यं यशदमादाय लोहदर्व्यान्तु विन्यसेत्।
तीव्राग्निना तु विद्राव्य चूर्णवारिप्रपूरिते।।
सच्छिद्रेण पिधानेन पिहितास्ये घटे क्षिपेत्।
सप्तवारं प्रयत्नेन यशदं शुद्धिमाप्नुयात्।। (R.T. 19/98-99)

1. Take Ashuddha Yashada and place it in a clean, large iron tablespoon.
2. Heat the tablespoon over a fire until the zinc melts completely.
3. Using a Pidhanaka Yantra (pouring apparatus), transfer the molten zinc into a vessel containing limewater (Churnodaka).
4. Retrieve the solidified yasad from the limewater and melt the Yashada again and pour it into fresh limewater.
5. Repeat the process of melting and pouring into fresh limewater seven times.
6. With each cycle, the zinc's appearance becomes progressively brighter.
7. After the final cycle, dry the purified zinc thoroughly.
8. Store it as Shuddha Yashada for pharmaceutical purposes.

Method 02

यशदं द्रावितं यत्नाद् गोदुग्धे स्नपयेद्भिषक्।
त्रिसप्तवारं यत्नेन यशदं शुद्धिमाप्नुयात्।। (R.T. 19/102)

1. Place Ashuddha Yashada in a clean, large iron tablespoon.
2. Heat the tablespoon over a flame until the yashada melts completely.
3. Pour the molten yasad into a vessel containing fresh cow's milk using a Pidhanaka Yantra (pouring apparatus).
4. Collect the solidified yashada from the cow's milk.
5. Re-melt the yashada and pour it into a new batch of fresh cow's milk.
6. Repeat the melting and pouring process 21 times.
7. With each cycle, the yashada becomes progressively brighter in appearance.
8. After the final cycle, dry the purified yashada thoroughly.

9. Store the Shuddha Yashada for use in pharmaceutical applications.

Marana

राशीकृत्य ततो भस्म शरावेण पिधापयेत्।
ज्वलदङ्गारवर्णं स्याद्यशदं तु तथा चिरम्।।
तथा प्रदीपयेदग्निं दिनमेकं भिषक्तमः।
स्वतः शीतं ततो ज्ञात्वा यशदं मृतमाहरेत्।। (R.T. 19/115)

Puta: Gajaputa

1. Take all the ingredients as required.
2. First, triturate Jarita Yashada with Kumari Svarasa for one day.
3. Form thin, flat chakrikas and dry them under the sun.
4. Place these chakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
5. Repeat this process until the bhasma passes the bhasma pariksha.

Dose

गुञ्जार्द्धतः समारभ्य गुञ्जैकप्रमितं मृतम्।
यशदं विनियुञ्जीत बलकालाद्यपेक्षया।। (R.T. 19/125)

Dose: ½ - 1 ratti (62 mgs - 125 mgs)

Anupana

Honey, Guduchi Svarasa, Trikatu Kashaya

Properties

यशदं तुवरं शिशिरं कटुकं परमं नयनामयनाशकरम्।
कफपित्तसमुत्थितरोगहरं बलवीर्यविवेकसमृद्धिकरम्।।
यशदं पाण्डुशमनं बहुमेहनिषूदनम्।
कासश्वासप्रशमनं निशास्वेदनिबर्हणम्।।
यशदं परमं श्लेष्मकलासंकोचकृन्मतम्।
समाख्यातं विशेषेण व्रणसंस्त्रावरोधनम्।।
श्रमावसादशमनं रजःस्त्रावनिषूदनम्।
कम्पवातापहं चैव विशेषात्परिकीर्तितम्।। (R.T. 19/120-123)

- **Rasa**: Kashaya, Katu
- **Guna**: Shita
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Kapha-pittahara
- **Karma**: Chakshushaya, Bala-Virya-Viveka.
- **Therapeutic Uses**: Grahani, Prasveda, Rajayakshma, Prameha, Shveta Pradara.

Probable Physico-Chemical Changes

During Shodhana Process

- **Physical Changes**: Repeated melting and quenching remove impurities, improve brightness, and refine the structure.
- **Chemical Changes**: Limewater or milk neutralizes toxins and impurities. Oxidation and reduction cycles help detoxify and purify the zinc.

During Marana Process

- **Physical Changes**: Zinc is reduced to fine powder through repeated incineration and trituration, altering its structure and color.
- **Chemical Changes**: Zinc oxidizes to zinc oxide (ZnO), becoming stable, inert, and biocompatible. Interaction with Kumari Svarasa aids in achieving medicinal properties.

Importance of Temperature While Processing

a. During Shodhana Process

- **Controlled Melting**: Zinc (Yashada) melts at 419.5°C. Maintaining this temperature ensures proper liquefaction without excessive oxidation or loss of material.
- **Quenching Efficiency**: Adequate heating allows complete melting, facilitating effective interaction with limewater or cow's milk for impurity removal.
- **Avoiding Overheating**: Excessive temperatures can lead to the evaporation of zinc or the formation of undesirable compounds, compromising the purification process.

b. During Marana Process

- **Oxidation to Zinc Oxide**: Precise temperature control during Gaja Puta (~1000–1200°C) ensures the conversion of metallic zinc to stable zinc oxide (ZnO), the therapeutic form.
- **Preventing Material Loss**: Overheating may cause volatilization of zinc, reducing yield and quality.
- **Uniform Conversion**: Sustained high temperature ensures complete chemical transformation and homogeneity of the Bhasma.
- **Structural Integrity**: Proper temperature maintains the fine particle size and desired crystalline structure, essential for bio-compatibility and therapeutic efficacy.

Yoga

1. Shilajatvadi vati
2. Laghuvasantamalati rasa
3. Yashadamrita malahara
4. Trivanga bhasma
5. Suvarnavasantamalati rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review through Therapeutic Attributes of Yashada bhasma	Seethachandran, Dept. of Rasashastra & Bhaishajya Kalpana, IPGT&RA, Gujarat Ayurveda University, Jamnagar, Gujarat, India.	Experimental studies indicate that Yashada Bhasma has no significant harmful effects on overall body function. Clinical trials demonstrate its effectiveness in managing Prameha (Diabetes mellitus), Swetapradara (Leucorrhea), and Vicharchika (Eczema), with no adverse effects reported. While some limitations were noted, these results provide a foundation for more extensive studies across a larger population.
2.	Characterization of Yashad Bhasma (Zinc calx) and establishment of the importance of Shodhan (purification)	Shilpa Patil, Department of Rasa Shastra, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi - 221005, Uttar Pradesh, India	In this study, 99.99% pure Yashad was processed in three batches with varying purification methods. All passed Bhasma Pariksha as ZnO, but Batch 3, which underwent both Samanya and Vishesh Shodhan, showed the highest quality due to its thorough processing.
3.	Pharmaceutical and clinical evaluations of Yashad Bhasmand Ashwagandhadi Yogin the management of Shwet Pradar	Ahuti Rai, PhD Scholar, M.G.C.G.V., Satna, M.P.	The study shows that Yashad Bhasma (Group I) provided a higher percentage of relief compared to Ashwagandhadi Yog (Group II). This may be attributed to the higher dose of Yashad Bhasma in Group I compared to the amount of Vanga in the Ashwagandhadi Yog formulation in Group II.

Mukta (Pearl)

Introduction

- Pearls form inside the soft mantle tissue of mollusks, with calcium carbonate deposited in concentric layers.
- While ideal pearls are round and smooth, baroque shapes also exist. Natural pearls are highly prized for their rarity and beauty.
- Being composed of calcium carbonate, pearls dissolve in vinegar, reacting with acetic acid to form calcium acetate and carbon dioxide.
- Pearls are referenced in Indian texts like Shrimadbhagavata, Mahabharata, and Brihat Samhita, valued as symbols of rarity and beauty.
- Since the Samhita era, pearls have been used therapeutically, with later developments in Rasashastra refining purification, incineration, and pishti preparation methods.

Synonyms

मुक्ता मुक्ताफलञ्चैव मौक्तिकं मौक्तिकेयकम्।
शुक्तिजं शौक्तिकेयञ्च शशिरत्नं शशिप्रियम्।। (R.T. 23/63)

Muktaphala, Mauktika, Mauktikeyaka, Shuktija, Shauktikeya, Shashiratna and Shashipriya.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	White, Pink, Cream, Green, Blue
Cleavage	None
Luster	Vitreous
Streak	White
Specific Gravity	2.60 – 2.85
Hardness	2.5 – 4.5
Fracture	Uneven
Transparency	Opaque

Sources

- **Natural Pearls (Muktika)**: Found in mollusks like oysters and mussels in freshwater or marine environments. Harvested from natural pearl beds in oceans or rivers.
- **Cultured Pearls**: Produced through human intervention by inserting a nucleus into oysters, commonly farmed in controlled aquatic settings.
- **Saltwater Pearls**: Obtained from marine oysters in saltwater bodies like the Arabian Gulf, Gulf of Mannar, and the coasts of Japan and Australia.

- **Freshwater Pearls**: Sourced from mussels in rivers, lakes, and ponds, especially in regions like China and North America.
- **Synthetic Pearls**: Man-made imitations crafted from materials like glass or plastic, often used in jewelry but not considered true Mukta Ratna.

Types

शुक्तिः शङ्खो गजः क्रोडः फणी मत्स्यश्च दर्दुरः।
वेणुश्चाष्टौ समाख्याताः मुक्तैर्मौक्तिकयोनयः।। (Ay.Pra. 5/13)

- Depend Upon Origin- 08

1. Shukti mukta
2. Shankha mukta
3. Gaja mukta
4. Kroda mukta
5. Phani mukta
6. Matsya mukta
7. Dardura mukta
8. Venu mukta

- Depend Upon Source- 02

1. Natural pearl
2. Cultured pearl
   - Naturally cultured
   - Prepared from glass or plastic

Grahya Lakshana

ह्लादि श्वेतं लघु स्निग्धं रश्मिवन्निर्मलं महत्।
ख्यातं तोयप्रभं वृत्तं मौक्तिकं नवधा शुभम्।। (R.R.S. 4/13)

1. The mukta (pearl) should possess a pleasing radiance (ahladana) that is visually appealing.
2. The pearl must be shveta (pure white), symbolizing purity and quality.
3. It should be laghu (lightweight), ensuring ease of handling and processing.
4. The mukta should have a snigdha (smooth and glossy) surface.
5. It should shine brightly, comparable to the rays of the sun.
6. Crystal-clear appearance is essential for pharmaceutical suitability.
7. Larger pearls are preferred for therapeutic use.
8. The pearl should appear as if filled with water, indicating its freshness and vitality.
9. A round and symmetrical body is ideal for pharmaceutical applications.

Agrahyata Lakshana

दीर्घं पार्श्वकृशं रूक्षं त्र्यस्रं श्यामञ्च सव्रणम्।
हतप्रभं क्षुद्रकायं मौक्तिकं हेयमीरितम्।। (R.T. 23/66)

1. A mukta with a long, uneven body and thin edges is considered unsuitable.
2. Pearls that are rough and lack smoothness are rejected.
3. Those possessing multiple angles or irregularities are deemed unfit.
4. Pearls with a blackish shade or discolorations are unsuitable for therapeutic use.
5. Muktas with little or no radiance fail to meet the required standard.
6. Pearls appearing as small, fragmented particles are not accepted.
7. Such defective muktas are classified as agrahya mukta and rejected for therapeutic purposes.

Shodhana

Method 01

जयन्तीस्वरसेनेह दोलायन्त्रे विधानतः।
यामैकं सततं स्विन्नं मौक्तिकं शुद्धिमाप्नुयात्।। (R.T. 23/67)

1. Roughly pound the mukta into smaller pieces for processing.
2. Tie the pounded mukta securely in a pottali (cloth bag).
3. Place the pottali in a dolayantra apparatus, using jayanti svarasa (liquid extract of Jayanti) as the liquid medium.
4. Subject the pottali to svedana (steam heating) for three hours (equivalent to one yama).
5. Remove the processed mukta from the pottali and allow it to dry completely.
6. Store the dried mukta in an airtight container to preserve it as shuddha mukta for pharmaceutical applications.

Method 02

अगस्त्यदृववयोगेन यामं स्विन्नमनारतम्।
दोलायन्त्रे पोट्टलीस्थं शुद्धिमायाति मौक्तिकम्।। (R.T. 23/68)

1. Pound the mukta roughly to achieve a coarse texture.
2. Place the pounded mukta in a clean cloth and tie it securely to form a pottali.
3. Use Agastya patra svarasa (juice of Agastya leaves) as the liquid medium for the svedana process.
4. Suspend the Pottali in the dolayantra apparatus.

5. Subject it to steaming svedana for 3 hours (one yama).
6. After the steaming process, carefully remove the pottali and open it.
7. Spread the contents to dry thoroughly.
8. Once dried, store the processed material in an airtight container.

Marana

मुक्ताफलन्तु तरुणीपरिस्रुतजलान्वितम्।
पिष्टं त्रिवारं पुटितं मृतिमाप्नोत्यनुत्तमाम्।। (R.T. 23/71)
Puta: Gaja Puta- three times

1. Take all the ingredients as required.
2. First, triturate Shuddha Mukta with Shatapatrika for one day.
3. Form thin, flat cakrikas and dry them under the sun.
4. Place these cakrikas in a Sharava Samputa and apply Sandhi Lepa. Then, administer Gaja Puta.
5. Repeat this process for three times or until the bhasma passes the bhasma pariksha.

Pishti

1. Take shuddha mukta in a clean khalva yantra (traditional mortar and pestle).
2. Triturate thoroughly to obtain a fine powder.
3. Add the desired quantity of gulaba jala (rose water) to the powdered mukta.
4. Triturate the mixture continuously for 3 days to achieve a very fine, smooth white powder with a rose fragrance.
5. Ensure the final product is fine, white in color, and has a distinct rose aroma.
6. Transfer the prepared mukta pishti into a suitable airtight container.
7. Store it in a cool, dry place for pharmaceutical and therapeutic use.

Dose

आरभ्य गुञ्जापादांशाद् गुञ्जैकप्रमितं मृतम्।
मौक्तिकं विनियुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/75)
Dose: $1/4^{th}$ - 1 ratti

Anupana

Honey, Butter, Milk.

Properties

मौक्तिकं वृष्यमायुष्यं मधुरं शिशिरं परम्।
दीपनं दाहशमनं नेत्र्यं वर्ण्यं च कीर्तितम्।।
जीर्णज्वरप्रशमनं त्वस्थिदन्तविवर्द्धनम्।
हृद्यं मेहहरं मेध्यं दन्तोद्भेदज्वरापहम्।।
मौक्तिकं सुशिशिरं क्षयापहं श्वासकासपरिकोपनाशनम्।
अस्थिशोथशमनं विषापहं देहवीर्यबलबुद्धिवर्धनम्।। (R.T. 23/72-74)

- **Rasa**: Madhura
- **Guna**: Shita
- **Virya**: Shita
- **Vipaka**: Madhura
- **Dosha**: Vata- Pittahara
- **Karma**: Dipana, Varnya, Hridya, Bala – Buddhi Vardhana.
- **Therapeutic Uses**: Kasa, Shvasa, Kshaya, Jirna Jvara, Pittaja Jvara, Dantodbhava Jvara, Hridaurbalya, Manovikara.

Probable Physico-Chemical Changes

a. During Shodhana Process

- **Physical Changes**: Pounding reduces size; svedana (steam heating) softens texture and removes surface impurities.
- **Chemical Changes**: Acidic plant extracts (Jayanti/ Agastya Svarasa) react with $CaCO_3$, dissolving contaminants and neutralizing toxins while preserving the calcium carbonate core.

b. During Marana Process

- **Physical Changes**: Trituration creates fine particles; repeated Gaja Puta transforms the crystalline structure into porous, white Bhasma.
- **Chemical Changes**: Thermal decomposition converts $CaCO_3$ into CaO, forming stable, bio-compatible compounds enhanced by herbal media.

Importance of Temperature While Processing

a. During Shodhana Process

- Moderate heat (~100°C) removes impurities and toxins.
- Maintains structural integrity while aiding the absorption of medicinal properties from the herbal medium.

b. During Marana Process

- High heat (600–900°C) breaks down the pearl into a fine, bioavailable ash (Mukta Bhasma).

- Controlled heating prevents under-burning (incomplete conversion) and over-burning (vitrification).

Yoga

1. Grahanikapata rasa
2. Vishamajvarantaka lauha
3. Makaradhvaja rasa
4. Mukata-panchamrita rasayana
5. Vasantamalati rasa
6. Trailokyachintamani rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review on Mukta Ancient Drug	Gawade VS, Department of Pharmaceutical Chemistry, Dr. D.Y. Patil Institute of Pharmaceutical Sciences and Research, Pimpri, Pune 411018, India,	Mukta, a bright white, round substance found in sea shells, is valued for its appearance and is extensively used in jewelry, cosmetics, and clothing. It consists of layered calcium carbonate and conchiolin around a central nucleus. As per Rasa Shastra, Mukta possesses Madhura, Sheeta, and Laghu properties and serves as a potent Pitta Shamaka. Its purification and Pishti preparation methods in Rasa Shastra enhance its efficacy in treating conditions like Amlapitta, Jwara, and Daha.
2.	Preparation of Mukta Bhasma by Two Different Methods and Its Comparative Analytical Study	Ketki Prakash Adhav, Lecturer, ASS Ayurved Mahavidyalaya, Nashik, Maharashtra, India.	This study aimed to compare the pharmaceutical preparation and analysis of Mukta Bhasma made through two different Shodhan and Maran methods. Two samples, Mukta Bhasma Godugdha Marit (MBG) and Mukta Bhasma Kulitha Marit (MBK), were analyzed. Results indicated similar values in physicochemical properties, solubility, and particle size for both samples. Qualitative analysis confirmed the presence of calcium, carbonate, and other inorganic elements in each Bhasma. Quantitative analysis showed slight variations, with Na, K, and Ca levels in MBG at 9±1.04, 50±3.76, and 283±25.95 and in MBK at 11±1.04, 53±3.72, and 300±23.96, respectively. Both methods produced effective Mukta Bhasma with comparable properties.
3.	Hepatoprotective and Anti-Oxidant Study of Mukta Bhasma (Calx of Cultured Pearls) Against CCl_4-Induced Hepatic Damage in Rats (In-Vivo): Pharmaceutical Science- Ayurvedha	Dr. Poornima B. Tukanatti, Assistant Professor, Department of Rasashastra and Bhaishajya Kalpana, KAHER's Shri B.M.Kankanwadi Ayurveda Mahavidyalaya, Shahpur, Belagavi-590003, Karnataka, India.	The study found that Mukta Bhasma (200 mg/kg) significantly protects against CCl_4 induced liver damage in Wistar rats, showing hepatoprotective and antioxidant effects comparable to Silymarin. It restored elevated liver enzymes and biochemical markers to near-normal levels ($p<0.001$) and improved antioxidant markers, reducing lipid peroxidation and enhancing catalase and glutathione levels. Histopathology confirmed reduced liver degeneration, affirming Mukta Bhasma's efficacy in liver protection.

Pravala (Coral)

Introduction

1. Corals (Pravala) belong to class Anthozoa under phylum Cnidaria.
2. They form compact colonies of identical polyps, which are spineless marine animals.
3. Polyps excrete calcium carbonate ($CaCO_3$) to form hard skeletons, vital for reef building.
4. Each polyp measures a few millimeters in diameter and has tentacles surrounding a central mouth.
5. Over generations, colonies grow large skeletons, unique to species.
6. Growth occurs via a sexual reproduction of polyps.
7. Sexual reproduction involves synchronized gamete release during full moon phases.
8. Corals (Pravala) were revered as gemstones in Indian history, with mentions in Shri-madbhagavata and Mahabharata.
9. Recognized since Samhita times, Pravala was later extensively utilized in Rasashastra for purification, incineration, and therapeutic applications.

Synonyms

प्रवालकः प्रवालश्च भौमरत्नश्च विद्रुमम्।
अब्धिजन्तुविशेषोत्थं तदेव परिकीर्तितम्।। (R.T. 23/128)

Pravalaka, Pravala, Bhaumaratna, Vidruma, Abdhi-Jantu-Visheshottha.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	White, Pink, Red, Blue.
Cleavage	None
Luster	Viterous
Specific Gravity	1.3 – 2.1
Hardness	3
Fracture	Uneven
Transpraency	Semi Transparent to Opaque

Sources

- **Natural Sources of Mercury**: Obtained from cinnabar ore (Hingula). Found in natural deposits of sulfide minerals.

Types

1. Depending on colour

1. White
2. Grey
3. Black
4. Red

2. Depending on the part used

1. Pravala mula
2. Pravala shakha

Grahya Lakshana

आरक्तमञ्जुलच्छायं स्निग्धं वृत्तञ्च निर्व्रणम्।
दीर्घस्थूलं गुरु दृढं ग्राह्यं विद्रुममुच्यते।। (R.T. 23/129)

1. Exhibits a radiant deep red color.
2. Has a smooth and soft texture.
3. Features long and bulky branches.
4. Free from any aberrations or imperfections.
5. Heavy and strong in nature.

Agrahyata Lakshana

पाण्डुरं सव्रणं रूक्षं सशिरं लघु धूसरम्।
कृष्णं सूक्ष्मं सुमसृणं हेयं विद्रुममीरितम्। (R.T. 23/130)

1. Has a pale color.
2. Shows aberrations across its surface.
3. Appears dry in texture.
4. Features multiple head-like structures.
5. Is light in weight.
6. Has blackish, slender branches.
7. Exhibits excessive luster.

Shodhana

Method 01

जयन्त्याः स्वरसेनेह दोलायन्त्रे तु विद्रुमम्।
यामैकं सुपरिस्विन्नं शुद्धिमायात्यनुत्तमाम्।। (R.T. 23/131)

1. Take the pravala and pound it roughly to achieve a coarse texture.
2. Place the roughly pounded pravala in a clean cloth and tie it securely to form a pottali (bundle).
3. Prepare a dolayantra (traditional steaming apparatus).
4. Use Jayanti svarasa (juice of Jayanti leaves) as the liquid medium for the steaming process.
5. Suspend the pottali in the dolayantra apparatus.
6. Subject it to steaming svedana for 3 hours (one yama).
7. Carefully remove the pottali after steaming.
8. Open it and wash the processed pravala thoroughly.
9. Spread the washed pravala in a clean area to dry completely.
10. Once fully dried, store the processed material in an airtight container.

Method 02

सर्जिकाक्षारसंयुक्ते सलिले परिपाचितम्।
यामैकेन प्रवालं तु शुद्धिमायात्यनुत्तमाम्।। (R.T. 23/132)

1. Take the pravala and pound it roughly to obtain a coarse texture.
2. Place the pounded pravala in a clean cloth.
3. Tie it securely to form a pottali (bundle).
4. Arrange a dolayantra (traditional steaming apparatus).
5. Use Sarjaksharajala (alkaline water prepared from Sarja) as the liquid medium for the steaming process.
6. Suspend the pottali in the dolayantra.
7. Perform steaming svedana for 3 hours (one yama).
8. After steaming, remove the pottali and open it.
9. Wash the processed pravala thoroughly with clean water.
10. Spread the washed pravala in a clean, dry area.

11. Allow it to dry completely.
12. Store the dried pravala in an airtight container.

Marana

विशोधितं विदुमं तु श्लक्ष्णचूर्णं तु कारयेत्।
कन्याम्भसाऽथ सम्पेष्य शोषयेत् कृतचक्रिकम्।।
सम्पुटस्थं ततः कृत्वा त्रिवारं पुटयेद्भिषक्।
एवं पुटत्रयैर्भस्म जायते शशिसुन्दरम्।। (R.T. 23/134-135)

1. Take the required quantity of Shuddha pravala in a clean khalva yantra (traditional mortar and pestle).
2. Triturate it thoroughly to obtain a fine powder.
3. Add the required quantity of ghritakumari svarasa (juice of Aloe vera) to the powdered pravala.
4. Triturate the mixture thoroughly to form a smooth, consistent paste.
5. Shape the paste into small, evenly sized and shaped pellets (chakrikas).
6. Dry the prepared pellets under sunlight until they harden completely.
7. Place the dried pellets in a sharava samputa (earthen crucible).
8. Seal the crucible securely and subject it to one laghu puta (mild calcination).
9. After cooling, collect the product and inspect its consistency.
10. Repeat the entire process (triturating, pellet-making, drying, and calcination) two more times (total of three cycles).
11. This ensures a clean, bright, moon-like white 'pravala bhasma' of high purity.
12. Once the final 'pravala bhasma' is obtained, ensure it is clean and bright white in color.
13. Store the prepared bhasma in a suitable airtight container to protect it from moisture and contamination.

विदुमं गव्यदुग्धेन सम्पेष्य कृतचक्रिकम्।
म्रियते पुटितं भस्म जायतेऽतिमनोहरम्।। (R.T. 23/136)

1. Triturate shuddha pravala in a khalva yantra to obtain a fine powder.
2. Mix the powder with godugdha (cow's milk) and triturate to form a paste.
3. Shape the paste into evenly sized chakrikas (pellets).
4. Dry the pellets under sunlight until hardened.
5. Enclose the dried pellets in a sharava samputa (earthen crucible) and perform one laghu puta.
6. Cool and inspect the product.
7. Repeat the calcination process three times to obtain pure, white pravala bhasma.
8. Store the final product in an airtight container for pharmaceutical and therapeutic use.

Pravala Pishti

1. Take shuddha pravala in a clean khalva yantra (traditional mortar and pestle).
2. Triturate thoroughly to obtain a fine powder.
3. Add the desired quantity of gulaba jala (rose water) to the powdered pravala.
4. Triturate the mixture continuously for 3 days to achieve a very fine powder.
5. Ensure the final product is of pale rose-red color and carries a distinct rose fragrance.
6. Transfer the prepared pravala pishti into a suitable airtight container.
7. Store it in a cool, dry place for further pharmaceutical and therapeutic use.

Dose

गुञ्जार्धतः समारभ्य गुञ्जाद्वयमितं परम्।
विदुमं विनियुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/142)

Dose: 1/4th - 2 ratti (31 to 250 mgs)

Anupana

Butter, cream and honey.

Properties

विदुमं सुमृतं क्षारं मधुरं लघु शीतलम्।
दीपनं पाचनं चैव दृष्टिरोगनिषूदनम्।।
त्रिदोषशमनं बल्यं विशेषात्कफवातनुत्।
क्षयकासहरं चैव रक्तपित्तप्रणाशनम्।।
स्वेदातिनिर्गमहरं रात्रिस्वेदहरं परम्।
विषघ्नं भूतशमनं वीर्यवर्णविवर्द्धनम्।। (R.T. 23/139-141)

- **Rasa**: Kshariya and Madhura.
- **Guna**: Laghu
- **Virya**: Shita
- **Dosha**: Kapha-Vatahara.
- **Krama**: Dipana, Pachana, Netra Roga, Balya
- **Therapeutic Indications**: Kshaya, Kasa, Raktapitta, Ratri- Shveda.

Probable Physico-Chemical Changes

a. During Shodhana Process

- Moderate heat (~100°C) during dolayantra svedana removes impurities.
- Controlled heating avoids structural damage and ensures thorough detoxification.

b. During Marana Process

- Precise high heat (~600–700°C) in laghu puta converts Pravala into bioavailable ash (bhasma).
- Repeated cycles with consistent temperature ensure proper calcination without vitrification or cracks.

Importance of Temperature while Processing

a. During Shodhana Process: Moderate heat (~100°C) removes impurities, ensuring detoxification without damaging the structure.

b. During Marana Process: High heat (~600–700°C) in controlled cycles ensures complete calcination, avoiding under- or over-burning.

Proper temperature ensures safety, bioavailability, and enhanced therapeutic efficacy of Pravala Bhasma.

Yoga

1. Pravalapanchamrita rasa
2. Kasturibhairava rasa
3. Ratnagarbha pottali
4. Sarvanga sundara rasa
5. Muktapanchamrita rasa
6. Putapakva vishamajvarantaka rasa
7. Apurvamalinivasanta rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Conceptual Review of Pravala (Coral) – A Marine Source of Natural Calcium	Geeta G. Gadad, Assistant Professor, Dept. of Rasa shastra and Bhaishajya Kalpana, KAHER'S Shri B M Kankanawadi Ayurveda Mahavidhyalaya Shahapur, Belagavi, Karnataka, India	This review explores the properties, preparation, and therapeutic uses of Pravala (coral), highlighting its significance in Ayurveda. It is primarily used in the treatment of Amlapitta, eye diseases, and cardiac disorders. Pravala's Pitta-shamaka and Asthiposhaka properties make it effective for treating calcium deficiency and Pitta imbalances.
2.	Pharmaceutico-analytical study of Praval Bhasma (Coral calax) with two different herbs	Arati P Dubewar, Professor HOD & Ph.D Guide, Department of Rasashastra evam Bhaishajyakalpana, Dr D Y PatilVidyapeeth deemed to be University. Dr. D.Y.Patil College of Ayurved & Research Center, Pimpri, Pune, M.S.	Pravala Bhasma was prepared using two different methods—triturating with Kumari Swaras and Guduchi Kashaya, followed by incineration in a muffle furnace. Physico-chemical tests such as Total Ash, Acid Insoluble Ash, Loss on Drying, and qualitative analysis by Namburi Phased Spot Test (NPST) were conducted. Both methods of preparation showed comparable potency and efficacy, indicating that Pravala Bhasma is suitable for further clinical use.
3.	Clinical evaluation of Ashokarishta, Ashwagandha Churna and Praval Pishti in the management of menopausal syndrome	Mansi B. Modi, Ayurvedic Practitioner, Department of Stree Roga and Prasuti Tantra, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India	A clinical trial was conducted to evaluate the efficacy of Ashokarishta, Ashwagandha Churna, and Praval Pishti in managing menopausal syndrome, following Ayurveda clinical trial protocols. 52 patients were registered, with 51 completing the study. The Kupperman Index Score, Menopause Rating Scale (MRS), and Menopause-Specific Quality of Life (MENQOL) questionnaires were used for assessment. Statistically significant reductions ($P < 0.01$) were found in both MRS and MENQOL scores. The combined treatment showed improved outcomes for both somatic and psychological symptoms in women with mild to moderate menopausal symptoms.

Vajra (Diamond)

Introduction

- Diamond, a pure form of carbon (C), is an allotrope where carbon atoms are arranged in a diamond lattice, a variation of the face-centered cubic crystal structure.
- Though less stable than graphite, the conversion from diamond to graphite under ambient conditions is negligible.

- Renowned for its hardness and thermal conductivity, diamond's exceptional physical qualities stem from strong covalent bonding.
- These properties make it indispensable for industrial tools like cutting and polishing, and scientific devices like diamond knives and anvil cells.
- Diamonds (Vajra) have fascinated civilizations, with references in Shrimadbhagavata, Mahabharata, and Brihat Samhita.
- From ancient Samhitas, diamonds were recognized for their medicinal potential.
- With the rise of Rasashastra, methods for purification, incineration, and therapeutic formulations of gemstones, including diamonds, were established.

Synonyms

हीरको हीरकं हीरमभेद्यं भिदुरं तथा।
कुलिशं वज्रकं वज्रं तथोक्तं भार्गवप्रियम्।। (R.T. 23/5)

Hiraka, Hira, Abheda, Bhidura, Kulisha, Vajraka, Vajra and Bhargava Priya.

Mineralogical Identification

Properties	Identification
Chemical Name	Carbon
Chemical Composition	C
Colour	Colorless
Cleavage	Perfect
Luster	Adamantine
Streak	Colourless
Specific Gravity	3.5 – 3.7
Hardness	10
Fracture	Conchoidal
Tenacity	Transparent, Translucent, Opaque

Sources

Before the mid-18th century, India and Brazil were the primary sources of diamonds. Over time, diamond deposits were discovered in several other regions around the world. Today, the leading diamond-producing nations include South Africa, Namibia, Australia, the USA, Russia, Ghana, and Botswana.

Types

Depend Upon Colour

1. Shveta Vajra
2. Rakta Vajra
3. Pitta Vajra
4. Krishna Vajra

Depend Upon Gender

1. Nara Vajra
2. Nari Vajra
3. Napumshaka Vajra

Grahya Lakshana

स्निग्धं विद्युद्विभं स्वच्छमलेख्यं च विलेखनम्।
तीक्ष्णं षट्कोणमष्टास्रं जात्यं हीरकमुच्यते।। (R.T. 23/6)

- The 'vajra' is soft to touch (snigdha).
- It has a lustrous appearance similar to electricity.
- The diamond looks clean and is extremely hard and unbreakable.
- It is sharp enough to cut glass.
- Its structure includes six angles and eight surfaces.
- Such a 'vajra' is considered the finest quality and is chosen for pharmaceutical applications.

Agrahyata Lakshana

वर्तुलं मलिनं नीलं भूत्याभं स्फुटितं खरम्।
सकाकपादं रेखाढ्यं हेयं हीरकमादिशेत्।। (R.T. 23/7)

- The 'vajra' is round-bodied with no angles or surfaces.
- It is unclean and bluish in color.
- Its radiance is dull and lacks brilliance.
- The diamond is broken and has a rough outer body with impressions resembling crow's claws.
- It contains multiple lines within its structure.
- Such a 'vajra' is deemed unsuitable for any pharmaceutical applications.

Doshas

1. General Dosha

- Bindu
- Kakapada
- Yava
- Mala
- Rekha

2. Apakva evam Ashuddha Bhasma Sevana

अशुद्धं कुरुते वज्रं कुष्ठं पार्श्वव्यथां तथा।
पाण्डुतापगुरुत्वं च तस्मात् संशोध्य मारयेत्।।
(R.J.Ni. 3 खं. 4 अ.)

Kushtha, Parshvapida, Pandu and Gurutava

Treatment

सितामधुघृतैः सार्द्धं गोदुग्धं दिनसप्तकम्।
विधिना सेवितं हन्ति वज्रदोषं चिरोत्थितम्।। (R.J.Ni. 3 खं. 4 अ.)

Sita, Madhu, Ghrita with milk taken for 7 days.

Shodhana

Method 01

कुलत्थकोद्ववक्वाथे दोलायन्त्रे विपाचयेत्।
व्याघ्रीकन्दगतं वज्रं त्रिदिनं तद्विशुद्ध्यति।। (Ay.Pra. 5/77)

1. Take the required quantity of Ashuddha Vajra and wrap it securely in a cloth to form a pottali (bundle).
2. Suspend the pottali in a dolayantra filled with a liquid medium, either kulattha kvatha or kodrava.
3. Place the dolayantra over a controlled, intense fire and subject the bundle to svedana (steam processing) for three consecutive days.
4. After completing the third day's svedana, carefully remove the vajra.
5. Wash the vajra thoroughly, then dry it properly.
6. Store the shuddha vajra in an appropriate airtight container for further pharmaceutical applications.

Method 02

कुलत्थक्वाथसंयुक्तं हीरं दोलाख्ययन्त्रगम्।
स्विन्नं दिनत्रयं यत्नाद्विशिष्टां शुद्धिमाप्नुयात्।। (R.T. 23/11)

1. Wrap the required quantity of ashuddha vajra in a clean cloth to form a pottali (bundle).
2. Suspend the pottali in a dolayantra (a specialized apparatus) filled with kulattha kvatha (a decoction) as the liquid medium.
3. Place the dolayantra over a strong and steady fire.
4. Subject the vajra to svedana (steam treatment) daily for three consecutive days.
5. On the third day, carefully remove the pottali from the apparatus and unwrap the vajra from the cloth.
6. Wash the vajra thoroughly to remove any residues.
7. Dry it completely in a clean and dry environment.
8. Store the shuddha vajra in an airtight container to preserve its quality.

Marana

हीरकं विमलं सूतं मृतन्तु समभागिकम्।
मनःशिला गन्धकञ्च समं दत्त्वा विमर्दयेत्।।
सम्पुटस्थं तु पुटयेद् वारणाख्ये पुटे भृशम्।
तावत्पुटेत्प्रयत्नेन यावन्नायाति पञ्चताम्।।
द्वितीयादिपुटेष्वत्र सूतं न विनियोजयेत्।
एवं चतुर्दशपुटैर्हीरकं म्रियते ध्रुवम्।।
अनुभूतं प्रकारोऽयं सुगमस्तु प्रकाशितः।
एवं मृतं हीरकन्तु वीतशङ्कः प्रयोजयेत्।। (R.T. 23/18–21)

1. Grind shuddha vajra into a fine powder using a khalva yantra.
2. Combine the powder with equal parts of parada bhasma (rasasindura), shuddha manahshila, and shuddha gandhaka.
3. Triturate into a homogenous mixture.
4. Enclose the mixture in a sarava samputa and subject it to one gajaputa.
5. After the first cycle, re-add shuddha manahshila and shuddha gandhaka (omit rasasindura) and repeat.
6. Continue the gajaputa process for 14 cycles to obtain white-colored vajra bhasma.
7. Store the final product in an airtight container for therapeutic use.

Dose

रक्तिकाया नेत्रगुणभागतस्तु कलांशकम्।
मृतं हीरं प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/28)

Dose : 1/32 -1/16 ratti (3.9 to 7.8 mgs)

Anupana

Honey, Santaika

Properties

सुमृतं हीरकं ह्यं परमं षड्रसान्वितम्।
योगवाहि मतञ्चैतत्सर्वोत्कृष्टं रसायनम्।।
राजयक्ष्मप्रशमनं मेहमेदोविनाशनम्।
पाण्डुशोथोदरहरं तथा क्लैब्यहरं परम्।।
वृष्यं महावृष्यमतीव नेत्र्यं बल्यं त्रिदोषघ्नमतीव वर्ण्यम्।
मेध्यं विशेषाद्विविधामयघ्नं सुधोपमं स्यात्सुमृतं तु हीरम्।।
(R.T. 23/25–27)

- **Rasa** : Shadrasa
- **Guna** : Snigdha
- **Vipaka** : Tridoshahara
- **Karma** : Hridya, Rasayana, Balya, Vrishya, Yogavahi, Ayushaprada.
- **Therapeutic Uses**: Udara, Pandu, Medodosha, Prameha, Shotha, Rajayakshma, Netraroga, Arbuda

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- The intense steaming in kulattha kvatha or kodrava kvatha softens and removes external impurities like dirt and organic residues.
- The abrasive nature of the liquid medium helps clean the surface.
- Minor surface etc. hing or roughening may occur due to prolonged exposure to acidic or alkaline decoctions.
- Reduction of stress or minor cracks in the crystal structure.

b. Chemical Changes

- Organic and inorganic impurities may react with the herbal medium, forming soluble by-products that are washed away during the process.
- Slight dissolution of surface material could result in a cleaner, detoxified vajra.
- Trace elements and bioactive compounds from the herbal decoction may interact with the diamond's surface, imparting medicinal properties.

During Marana Process

a. Physical Changes

- Grinding reduces the vajra to a fine powder, increasing surface area for subsequent reactions.
- After repeated calcination (puta), the vajra becomes softer and transforms into a fine ash.
- The raw vajra transitions to white bhasma, indicating complete incineration and transformation into its medicinal form.

b. Chemical Changes

- Prolonged high-temperature exposure in gajaputa causes a breakdown of the carbon lattice structure of the vajra.
- The diamond transitions into an amorphous or graphitic carbon form, ultimately calcining into an ash-like state.

Importance of Temperature While Processing

a. During Shodhana Process

- Moderate, consistent heat (~100°C) during steaming in kulattha kvatha or kodrava kvatha helps remove physical and chemical impurities.
- Facilitates the reaction between impurities and the herbal medium, dissolving toxins.
- Controlled heating prevents damage to the diamond's crystalline structure while allowing sufficient cleansing.
- Optimal temperature ensures vajra absorbs bioactive elements from the herbal decoction.

b. During Marana Process

- High heat (~900–1,000°C) in gajaputa breaks down vajra's crystalline carbon lattice, converting it into an amorphous or calcined state suitable for medicinal use.
- Repeated cycles of controlled calcination ensure a gradual and complete transformation into fine, bioavailable ash (bhasma).
- Prevents over-burning, which could cause vitrification or loss of medicinal properties.
- Heat aids chemical reactions between vajra and added substances like parada (mercury), gandhaka (sulfur), and manahshila (arsenic trisulfide), forming stable compounds with enhanced therapeutic value.

Yoga

1. Kapardakokila rasa
2. Vasantakusumakara rasa
3. Ratnagarbha pottali
4. Kamadeva rasa
5. Navaratnarajamriganka rasa
6. Mahalakshmivilasa rasa
7. Mani parpati
8. Hiraka rasayana

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Comprehensive Appraisal on Shodhana Methods of Precious Gemstone: Vajra (Diamond)	Dr. Dipali Parekh, Department of Rasa Shastra and Bhaisajiya Kalpana, ITRA, Jamnagar, Gujarat-361 008, India. E-mail: E-mail: dipali178@gmail.com	This review examines 49 texts on Vajra Shodhana methods, identifying 34 techniques. These methods are classified into five basic principles, with Swedana (heat application) and Nisechana (immersion) as individual processes, while the others involve continuous methods. Vajra Shodhana techniques primarily use heat application and immersion, with additional continuous processes.
2.	A Review Of Vajra: An ancient and Precious Drug in Rasashastra	Vd. Priyanka D. Tamane, M.D. (Scholar), Rasashastra – Bhaishajya Kalpana, LRP Ayurvedic Medical College, Hospital, PG Institute & Research Centre, Islampur.	Vajra (Diamond), a non-toxic substance, is widely used in Rasashastra after undergoing Shodhana (purification) to prevent any adverse effects. Vajra Bhasma, a key component in many formulations, is considered a Rasayana and is compared to nectar (Sudha). It possesses all six Rasas and exhibits therapeutic benefits for conditions like Rajayaksma, Prameha, Medovikara, and Panduroga, among others. Vajra is recognized as a potent rejuvenator and holds significance in both medicinal and ornamental applications.
3.	An exploration of the preliminary unit operative pharmaceutical process of Vajra Bhasma (diamond ash)	Dr. Dipali Narendrakumar Parekh, PhD scholar, Department of Rasa Shastra & Bahisajya Kalpana, Institute of teaching and research in Ayurveda, Jamnagar, Gujarat, India. E-mail: dipali178@gmail.com	Vajra, after purification, proves valuable in both therapeutic and ornamental uses, particularly for rejuvenation and treating various ailments. Vajra was standardized using Raman spectroscopy. After 108 cycles of Nisechana (quenching) in the Shodhana process, and Marana with Gulab Arka and Kumari Svarasa at 900°C for 1 hour, Vajra Bhasma showed a 2.84% weight loss in Shodhana and a 9.30% weight gain in Marana. 60 Putas achieved the desired Sidhhi Lakshanas. The study confirms the effectiveness of Ayurvedic preparation methods, emphasizing the Bhavana process in Marana.

Kaparda (Cowries)

Introduction

- Kaparda or Varatika is categorized as the fourth mineral drug in the Sadharanarasa group.
- It is commonly identified as "marine shell," "cowry," or "cowrie" in English, with the plural form being "cowries."
- The term "cowrie" refers to a group of small to large sea snails belonging to the Cypraeidae family, a type of marine gastropod mollusc.
- It can also specifically denote the smooth, shiny shells of these snails.
- Cowrie shells are generally egg-shaped but feature a flat underside.
- The underside displays a long, narrow, slit-like opening with toothed edges, giving the shells their distinct appearance.
- Knowledge of the therapeutic use of marine shells (Kaparda) dates back to ancient Indian texts such as the Charaka Samhita.
- Their medicinal value has made them an integral part of traditional practices, particularly in Ayurveda.
- Kaparda is valued for its role in parada jarana (a process in Ayurvedic alchemy).
- As a result, it has been classified under the Sadharana Rasa group, emphasizing its significance in ancient healing sciences.

Synonyms

वराटको वराटश्च वराटी च वराटिका।
कपर्दकः कपर्दश्च कपर्दी च कपर्दिका॥
बालक्रीडनकश्चापि चरो वर्यश्चराचरः।
वराटकं वराटं च कपर्दं च निगद्यते॥ (R.T. 12/82-83)

Varataka, Varata, Varati, Vatatika, Kapardaka, Kaparda, Kapardi, Kapardika, Balakridanaka, Cara and Charachara.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	Colorless
Cleavage	Perfect
Luster	Vitreous
Streak	White
Specific Gravity	2.71
Hardness	3

Properties	Identification
Fracture	Conchoidal
Transparency	Transparent to Translucent

Sources

1. Kaparda refers to the external shell of the sea snail species Cypraea Moneta.
2. These snails inhabit shallow waters in warm seas, thriving in coastal ecosystems.
3. When the snails are washed ashore or caught in fishing nets, they are gathered by fishermen.
4. The fleshy part of the snail is consumed as food, while the shell is preserved and identified as Kaparda.s

Types

वराटिका त्रिधा प्रोक्ता पीता श्वेता च धूसरा।
पीतोत्तमा मध्यमा तु श्वेतान्या त्वधमा मता।। (R.T. 12/84)

Sr. No.	Colour	Indications
1.	Pitta	Uttama
2.	Shveta	Madhyama
3.	Dhasura	Adhama

पीताभा ग्रन्थिका पृष्ठे दीर्घवृत्ता वराटिका।
रसवैद्यैर्विनिर्दिष्टा सा चराचरसंज्ञिका।।
सार्धनिष्कभरा श्रेष्ठा निष्कभारा च मध्यमा।
पादोननिष्कभारा च कनिष्ठा परिकीर्त्तिता।।
तदन्ये तु वराटाः स्युर्गुरवः श्लेष्मपित्तलाः।। (R.R.S. 3/130–132)

1. Varatika: Yellowish Colour

- 1½ Nishka
- 1 Nishka
- ¾ Nishka

2. Varata: Light weight than Varatika

Grahya Lakshana

दीर्घवृन्ता स्वर्णवर्णा पृष्ठे च ग्रन्थिला तथा।
सार्द्धैकशाणप्रमिता वराटी कथितोत्तमा।।
शाणोन्मिता मध्यमा स्याच्छाणार्द्धप्रमिताधमा।
रसज्ञैरुत्तमैवेह भस्मकर्मणि शस्यते।। (R.T. 12/85–86)

Kaparda with a 'dirgha-vrinta', golden-colored posterior, and small nodules is ideal.

Weight Categories

- **Uttama (Best)**: 1.5 karta (18 g).
- **Madhyama (Moderate)**: 1 Sana (3 g).
- **Adhama (Inferior)**: Half Sana (1.5 g).

Only uttama variety should be used after proper purification and incineration.

Shodhana

Method 01

दोलायन्त्रे तु यामैकं काञ्जिकेन वराटिका।
स्विन्ना प्रक्षालिता चोष्णवारिणा शुद्धिमाप्नुयात्।। (R.T. 12/87)

1. Break the Kaparda into smaller pieces.
2. Place the pieces in a pottali and tie it securely.
3. Suspend the pottali in a dolayantra (swing apparatus).
4. Use kanji (fermented liquid) as the liquid medium.
5. Subject the pottali to svedana for one yama (3 hours).
6. Remove the pottali from the dolayantra.
7. Open the cloth and thoroughly wash the Kaparda pieces with warm water.
8. Dry the purified Kaparda pieces completely.
9. Store them securely as Shuddha Varatika for therapeutic use.

Method 02

अम्लेन केनचिद्वापि दोलायन्त्रे विपाचिता।
वराटी याममात्रेण विशुद्ध्यति न संशयः।। (R.T. 12/89)

1. Break the Kaparda into smaller pieces.
2. Place the pieces in a pottali and tie it securely.
3. Suspend the pottali in a dolayantra (swing apparatus).
4. Use kanji (fermented liquid), nimbu rasa (lemon juice), or any other amla dravya (sour substance) as the liquid medium.
5. Heat the setup to subject the pottali to svedana for one yama (3 hours).
6. Remove the pottali from the dolayantra.
7. Open the cloth and thoroughly wash the Kaparda pieces with warm water.
8. Dry the purified Kaparda pieces completely.
9. Store them properly as Shuddha Varatika for therapeutic applications.

Marana

Method 01

अङ्गाराग्नौ स्थिता ध्माता सम्यक् प्रोत्फुल्लिता यदा।
स्वाङ्गशीता मृता तां तु पिष्ट्वा सम्यक् प्रयोजयेत्।।

(Ay.Pra. 2/300)

1. Place the Shuddha Kaparda on glowing charcoal.
2. Allow the heat to make the Kaparda pieces brittle and lightweight.
3. Once the desired texture is achieved, carefully collect the heated Kaparda.
4. Triturate the brittle Kaparda into a fine powder.
5. Store the prepared powder as Varatika Bhasma.
6. The bhasma is now ready for pharmaceutical and therapeutic applications.

वराटकांस्तु विमलान् शरावे स्थापयेद्भिषक्।
शरावेणापरेणाथ सम्यगाच्छादयेत्ततः।।
सन्धिलेपं ततः कृत्वा शोषयेदातपे पुनः।
करीषाग्नौ पचेत्कामं यत्नतस्तु भिषग्वरः।।
स्वाङ्गशीतं समुद्धृत्य खल्वे सञ्चूर्णयेत्ततः।
शरदिन्दुनिभं भस्म सर्वयोगेषु योजयेत्।। (R.T. 12/91-93)

1. Place the shuddha varatika inside a Sarava Samputa (a lidded crucible).
2. Seal the samputa securely to prevent leakage.
3. Allow it to dry completely.
4. Subject the sealed samputa to one gajaputa, using dry cow dung cakes as fuel for uniform heating.
5. Allow the samputa to cool naturally to room temperature.
6. Open the samputa to find the white-colored bhasma (bright as a full moon).
7. Triturate the bhasma into a fine powder.
8. Store the bhasma in an airtight container to preserve its quality.
9. The prepared Varatika Bhasma is ready for pharmaceutical and therapeutic applications.

Dose

250 mg

Anupana

Vasa Svarasa, Nimbu Svarasa, Trikatu Kashaya, Udumbara Rasa.

Properties

बराटी दीपनी चोष्णा नयनातङ्कहारिणी।
कर्णस्रावहरात्यर्थं वह्निमान्द्यविनाशिनी।।
पक्तिशूलादिशमनी ग्रहणीगजसिंहिका।
क्षयस्फोटापहा वृष्या मात्रा रक्तिद्वयोन्मिता।। (R.T. 12/95-96)

- **Rasa:** Katu, Tikta
- **Guna:** Guru, Ushna
- **Virya:** Ushna
- **Vipaka:** Katu
- **Dosha:** Vatakaphahara
- **Karma:** Pachana, Vrishya, Netrya, Grahi.
- **Therapeutic Uses:** Agnimandhya, Parinama Shula, Grahani, Rajayakshma, Karna Srava, Netraroga, Sphota, Raktavikara, Shukrakshaya.
- **Precaution:** After Preparing Bhasma, It should be kept in water for 24 hours, to reduces Tikshnatva.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Breaking Kaparda increases surface area.
- Steaming and washing remove impurities, leaving a smoother surface.

b. Chemical Changes

- Acidic mediums (kanji, lemon) react with calcium carbonate, releasing CO_2 and forming water-soluble calcium salts.
- Detoxification and absorption of medicinal properties from the sour liquid medium.

During Marana Process

a. Physical Changes

- Heat makes Kaparda brittle, reducing its weight and transforming it into a fine powder.

b. Chemical Changes

- Calcium carbonate decomposes into calcium oxide and CO_2.
- Organic impurities are eliminated, and the material becomes a white, fine ash (Varatika Bhasma) suitable for therapeutic use.

Importance of Temperature While Processing

a. During Shodhana Process

- **Controlled Heating**: During Svedana in Dolayantra, maintaining a consistent temperature ensures the Kaparda pieces are exposed to the therapeutic medium (Kanji or amla dravya) without degrading their structure.
- **Optimal Extraction**: Proper temperature facilitates the removal of impurities and enhances the absorption of the medium's purifying qualities.

b. During Marana Process

- **Uniform Heating**: In Angaragni and Gajaputa, controlled temperature ensures that the Kaparda

becomes brittle, lightweight, and chemically transformed into the desired bhasma.

- **Avoiding Overheating**: Excessive temperature can lead to improper bhasma formation, altering its therapeutic properties.
- **Siddhi Lakshana**: Correct temperature is crucial to achieving the characteristic color, texture, and fineness indicative of properly prepared Varatika Bhasma.

Yoga

1. Pravala Panchamrita Rasa
2. Pradarantaka Lauha
3. Lavanagadi Vati
4. Hemagarbha Pottali
5. Ratnagarbha Pottali Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Efficacy of Kaparda Bhasma, A Popular Ayurvedic Drug in the Management of Amlapitta (Acid Peptic Syndrome) European Journal of Pharmaceutical and Medical Research	Rohit Kumar Ravte, Hospital Division, National Research Institute of Ayurvedic Drug Development, CCRAS, Ministry of AYUSH, Government of India, 4CN Block, Sec-5, Bidhannagar, Kolkata-700091, West Bengal, India.	A clinical study involving 10 patients with Amlapitta, conducted at the OPD of the National Institute of Ayurveda, Jaipur, evaluated the therapeutic potential of Kaparda Bhasma over a 21-day treatment period. The outcomes were measured using a custom scoring system, revealing significant efficacy without any reported adverse drug reactions (ADRs). Improvements included a 50% reduction in Amlotkalesh, 75% in Sirovedana, 66.66% in Antrikujana and Angasada, 60% in Avipaka, and 75% in Gorava. Overall, symptom relief was recorded at 47.96%, highlighting Kaparda Bhasma as a promising Ayurvedic remedy for managing Amlapitta.
2.	Pharmaceutical Study of 'Kapardika Bhasma'	Kulshrestha Mayank Krishna, Dept. of Rasa Shastra and Bhaisajya Kalpana, Rajiv Lochan Ayurveda Medical College and Hospital, Chandkhuri, Durg (C.G), India	In Ayurveda, metallic preparations have been utilized for centuries in minimal doses to manage various ailments, with Kapardika being a significant component in traditional practice. Ensuring the quality of such preparations has always been a critical concern. The findings of this study emphasize the importance of incorporating advanced analytical methods as a prerequisite for assessing the quality of Bhasma and related formulations. These techniques are essential for establishing detailed label claims. Further research is required using animal models to investigate the absorption dynamics and elemental impact of these Bhasmas at the tissue level.
3.	Pharmaceutical Preparation of Kapardika Bhasma	Dr Santosh Pawale, M.D.PhD. (Scholar) (Ayu.) Assisstant Professor, Post Graduate Department of Rasashatra & B.K.,PMT's Ayurved College, Shevgaon, Ahmednagar, Maharashtra, India	Kapardika Bhasma was meticulously prepared using premium raw materials sourced from S.G. Phytopharma, Kolhapur. The Shodhana process was carried out using fresh Nimbu Svarasa, yielding 480g of purified Kapardika with a minor loss of 20g. During Marana, the material was triturated with Kumari Svarasa and subjected to three cycles of Gajaputa, resulting in yield losses of 4.16%, 2.17%, and 2.22%, respectively. The process successfully produced Kapardika Bhasma with minimal losses during both purification and incineration, validating the effectiveness of traditional Ayurvedic preparation techniques.

Shukti (Oyster Shell)

Introduction

- Sukti has been used for pharmaceutical and therapeutic purposes since ancient times, particularly during the 'Samhita period.'
- Classical texts such as 'Charaka Samhita,' 'Sushruta Samhita,' 'Ashtanga Sangraha,' and 'Ashtanga Hridaya' provide extensive references to its application.
- Additionally, 'Rasarnava' and 'Rasaratnakara' categorize it under 'Suklavarga,' offering detailed insights, while the 12th chapter of 'Rasatarangini' elaborates further on its properties.
- Oysters, a type of bivalve mollusc, inhabit marine or brackish waters and are known for their highly calcified shells composed of Calcium Carbonate ($CaCO_3$).
- Certain oysters are consumed as food, often regarded as aphrodisiacs, while pearl oysters, part of the Pteriidae family, are prized for producing pearls.
- Both cultured and natural pearls, valued commercially, also originate from other molluscs like freshwater mussels.

Synonyms

शुक्तिश्च शुक्तिका चापि मुक्तामाता तथैव च।
मुक्तागृहं महाशुक्तिः मौक्तिकप्रसवा च सा।।
मुक्ताशुक्तिस्तथा मुक्तागेहं मौक्तिकमन्दिरम्। (R.T. 12/64-65)
जलशुक्तिर्वारिशुक्तिः कृमिभूः क्षुद्रशुक्तिका।
शम्बूका जलडिम्बश्च पुटिका तोयशुक्तिका।। (Ay.Pra. 2/328)

Shukti, Shuktika, Muktamata, Mukta-griha, Maha-Shukti, Mauktika-Prasava, Mukta-shukti, Mukta-gaha and Mauktika-Mandira, Jala-shukti, Vari-shukti, Krimibhu, Kshudra-Shukti, Shambuka, Jaladimba, Putika and Toya-shukti.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	Whitish Grey Outside
Specific Gravity	1.15

Sources

1. True oysters (Ostreidae family) are found globally in shallow waters, forming beds or reefs.
2. Key species include:
   - Eastern American oysters (Canada to Argentina).
   - Pacific oysters (Japan to Australia).
3. In India, the native oyster (*C. madrasensis*) is common along the coasts, particularly in the Andaman Islands, Bombay, Madras, Kerala, and Orissa.

Types

2 Types

1. Mukhta Shukti (within Pearl)
2. Jala Shukti (without Pearl)

Shodhana

जयन्त्याः स्वरसेनैव शुक्तिं दोलागतां पचेत्।।
यामैकेनैव नियतं शुक्तिः शुद्धिमवाप्नुयात्। (R.T. 12/65-66)

1. Choose larger-sized Sukti shells for the process.
2. Scrape the posterior surface of the shells with a sharp knife to remove oceanic alkaline deposits.
3. Place the cleaned shells into a cloth and tie securely to form a pottali (bundle).
4. Immerse the pottali in a dolayantra filled with jayanti svarasa (liquid medium).
5. Steam the setup for one yama (approximately 3 hours).
6. Remove the pottali, wash the shells thoroughly with water, and dry them completely.
7. Store the dried shells as shuddha Sukti for future applications.

Marana

शुक्तिकां खण्डशः कृत्वा सम्पुटस्थां ततः पुटेत्।।
हिमकुन्देन्दुसङ्काशां शुक्तेर्भूतिं समाहरेत्। (R.T. 12/67-68)

1. Place the pieces of Shuddha Shukti into a Sharava Samputa (earthen container).
2. Seal the samputa properly and subject it to one Gajaputa (a high-temperature heating process).
3. Allow the samputa to cool naturally to room temperature.
4. Open the samputa and collect the white-colored bhasma formed inside.
5. Grind the collected bhasma thoroughly to ensure a fine and uniform texture.
6. Store the prepared Shukti Bhasma in an airtight container to preserve its quality for future use.

Dose

रक्तिद्वयमिता मात्रा सुक्तागेहस्य कीर्तिता।। (R.T. 12/70)

2 ratti (250 mgs)

Anupana

Honey, Ghee or Milk.

Properties

स्निग्धा रुच्या श्वासहरा दीपनी मधुरा मता।
इष्टिकावर्णसङ्काशां नाशयेन्मूत्रशर्कराम्।।
प्लीहानं नाशयत्याशु तथा च जठरामयान्। (R.T. 12/68-70)
जलशुक्तिः शूलहरा कटुः स्निग्धा च दीपनी।
बल्या गुल्महरा रुच्या विषदोषहरा मता।। (R.T. 12/81)

- **Rasa**: Madhura, Katu
- **Guna**: Snigdha
- **Dosha**: Vata- Pittahara
- **Karma**: Dipana, Pachana, Vishanashana, Ruchikara.
- **Therapeutic Indications**: Udara Roga, Shvasa, Kasa, Jvara, Pliha Roga, Hridyashula, Mutra Roga.

Probable Physico-chemical Changes

a. During Shodhana Process

- **Physical**: Removes impurities, softens structure, and reduces weight.
- **Chemical**: Eliminates toxic salts, neutralizes impurities, and infuses medicinal properties from the medium.

b. During Marana Process

- **Physical**: Shells become brittle, turn white, and are ground into fine powder.
- **Chemical**: Organic matter burns off; calcium carbonate converts to calcium oxide; stable bioavailable compounds form through oxidation and decomposition.

Importance of temperature while processing

a. During Shodhana Process

- **Controlled Heating**: Ensures uniform detoxification and removal of impurities like oceanic salts without damaging the structural integrity of Sukti.
- **Enhanced Absorption**: Optimal temperature helps the Sukti absorb therapeutic properties from the Jayanti Svarasa.
- **Prevention of Overheating**: Excessive heat during Svedana can degrade the medicinal properties of the medium.

b. During Marana Process

- **Complete Transformation**: High temperature in Gajaputa facilitates the conversion of calcium carbonate ($CaCO_3$) into calcium oxide (CaO), ensuring proper bhasma formation.
- **Color and Texture Development**: Precise temperature control leads to the desired Himakunda-indu-sankasha (snow-white) color and fine texture.
- **Avoiding Under/Over Heating**:
- **Underheating**: May result in incomplete incineration, leaving unprocessed residues.
- **Overheating**: Can alter therapeutic efficacy or cause excessive brittleness.

Yoga

1. Panchapravalaamrita Rasa
2. Vishmajvarantaka Rasa
3. Grahanishardula Rasa
4. Vadavanala Rasa
5. Lutavishanashaka Agada

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pharmaceutical standardization of Jala Shukti Bhasma and Mukta Shukti Bhasma	Kirti Kumar G., Ayurvedic Practitioner, Gujarat.	The study standardized the manufacturing procedure of Jala Shukti Bhasma and Mukta Shukti Bhasma, analyzing five batches each. Shodhana resulted in an average weight loss of 2.42% and 2.92%, respectively. During the Marana process, Jala ShuktiBhasma exhibited a weight loss of 7.79%, while Mukta Shukti Bhasma showed 7.05%. Mukta Shukti Bhasma was found to be 2.8 times more expensive than Jala Shukti Bhasma, highlighting the significance of precise cost and weight management in production.
2.	Mukta Shukti Property And Its Utilization	Dr. Arun Kumar Nema, P.G Scholar (Final Year) Department of Rasshastra Avm Bhaishajya Kalpna, Rani Dullaiya Smriti Ayurved P.G College and Hospital Bhopal (M.P).	Muktashukti Bhasma is an Ayurvedic medicine primarily used for managing digestive disorders and ailments related to gastritis. It effectively alleviates symptoms such as belching, bloating, heartburn, and constipation while improving overall digestive health. It is beneficial for relieving stomach pain and enhancing immunity levels. This versatile remedy supports better digestive function and provides significant relief from gastritis-associated discomforts, making it a valuable therapeutic option for gastrointestinal health and immunity enhancement.

Shankha (Conch Shell)

Introduction

1. The term conch refers to various medium-to-large sea snails or their distinctive shells, typically featuring a high spire and a siphonal canal, tapering to points at both ends.
2. True conches belong to the family Strombidae, particularly the genus Strombus and related genera like Eustrombus.

3. Conch shells are primarily composed of calcium carbonate ($CaCO_3$), giving them their durable structure.
4. The Indian conch shell, or Shankha, is scientifically named Turbinella pyrum. It features a porcelaneous surface, meaning the shell is hard, smooth, shiny, and partially translucent, resembling porcelain.
5. The sea snail that produces the shankha shell is native to the Indian Ocean and nearby seas, thriving in warm marine environments. Shankha holds a prominent place in ancient Indian texts and mythology, with mentions in the Mahabharata and Shrimad Bhagavata.
6. Since the Samhita period, Shankha has been used in Ayurveda for both pharmaceutical formulations and therapeutic applications. Its medicinal significance is documented in classics like Charaka Samhita, Sushruta Samhita, and Ashtanga Sangraha.

Synonyms

शङ्खस्तु शङ्खकः कम्बुस्त्रिरेखश्च समुद्रजः।
सुनादो दीर्घनादश्च कम्बोजश्च प्रकीर्तितः।। (R.T. 12/1)

Shankha, Shankhaka, Kambu, Trirekha, Samudraja, Sunada, Dirghanada and Kamboja.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonare
Chemical Composition	$CaCO_3$
Colour	White, Red, Yellow, Orange
Cleavage	Imperfect
Luster	Viterous
Streak	White
Specific Gravity	2.95
Hardness	3.5 – 4
Fracture	Subconchoidal
Transparency	Translucent to Transparent

Sources

1. Conches are widely distributed in marine environments and can be found along most sea shores.
2. In the Indian Ocean, they are located from Myanmar (Burma) to Sri Lanka.
3. In India, conches are primarily sourced from three distinct regions, each with unique morphological characteristics:
   - The Indian Ocean near Ram Setu, including Sri Lanka, Rameshwaram, and Tuticorin.
   - The Arabian Sea, along the western coast of India.
   - The Bay of Bengal.
4. Imitation shells, such as Lightning Whelks, are mainly sourced from Florida and the Gulf of Mexico.

Types

शङ्खस्तु द्विविधः प्रोक्तो रसतन्त्रविचक्षणैः।
प्रथमो दक्षिणावर्तो वामावर्तोऽपरो मतः।। (R.T. 12/3-5)

Two types:

1. Dakshinavarta shankha
2. Vamavarta shankha

Grahya Lakshna

वृत्तः स्निग्धः सूक्ष्ममुखो निर्मलश्चेन्दुसुन्दरः।
दीर्घकायो गुरुश्चापि शङ्खः श्रेष्ठः प्रकीर्तितः।। (R.T. 12/2)

1. The ideal Shankha (conch shell) has a round body with a smooth external surface, free from irregularities.
2. It features a small and well-formed opening at the base, ensuring a compact and uniform structure.
3. The shell should be clean, bright, and radiant, resembling the full moon in its luster and purity.
4. A lengthy and heavy shankha is considered superior, reflecting durability and therapeutic efficacy.
5. These characteristics together make such shankha the ideal choice for medicinal and Ayurvedic applications.

Shodhana

Method - 01

शङ्खस्तु खण्डशः कृत्वा पोट्टल्यां स्थापयेद्भिषक्।
दोलायन्त्रे चतुर्यामं पचेज्जम्बीरवारिणा।।
प्रक्षालयेच्छङ्खखण्डान् प्रतप्तेनाम्भसा ततः।
इत्थं नातिचिरादेवं शङ्खः शुद्धिमवाप्नुयात्।। (R.T. 12/6-7)

1. Break the shankha (conch shell) into smaller pieces for easier processing.

2. Place the smaller pieces of shankha in a clean cloth and securely tie it into a Pottali (bundle).
3. Suspend the pottali in a Dolayantra (traditional steaming apparatus) containing Jambira Nimbu Rasa (juice of citron or lemon) as the liquid medium.
4. Heat the Dolayantra gently and perform the Svedana (steaming) process for four yama (12 hours), allowing the shell to undergo the purification process.
5. After completing the Svedana, remove the pottali, open it, and thoroughly wash the shankha pieces with warm water to eliminate impurities.
6. Dry the cleaned shankha completely and store it in a clean, airtight container. This ensures the preparation of shuddha shankha, purified and ready for therapeutic use.

Method - 02

जयन्त्या: स्वरसेनैव शङ्खं दोलागतं पचेत्।
यामैकं पाचनादेव शुद्धिमायात्यनुत्तमाम्।। (R.T. 12/8)

1. Break the shankha (conch shell) into smaller pieces.
2. Secure the pieces tightly in a cloth to form a pottali (bundle).
3. Place the pottali in a dolayantra containing jayanti svarasa (liquid medium).
4. Steam the setup for one yama, equivalent to 3 hours.
5. Remove the pottali, wash its contents thoroughly with water, and dry them completely.
6. Store the dried material as shuddha shankha for future applications.

Marana

शुद्धशङ्खस्य खण्डानि शरावे स्थापयेत्सुधी:।
शरावेण पिधायाथ यत्नात्सन्धिं प्रलेपयेत्।।
आतपे त्वथ संशोष्य पुटेद् गजपुटे भिषक्।
स्वत: शीतं समुद्धृत्य खल्वे सूचूर्णयेद् भिषक्।।
चूर्णितञ्चाथ विज्ञाय सम्पुटस्थं ततः पुटेत्।
एवं पुटद्वयेनैव शङ्खको मृतिमाप्नुयात्।। (R.T. 12/17-19)

1. Gather all necessary ingredients, including Shuddha Shankha and Nimbu Svarasa.
2. Triturate Shuddha Shankha with Nimbu Svarasa continuously for a full day until a smooth paste is formed.
3. Mold the paste into thin, flat cakrikas (discs) and dry them thoroughly under sunlight.
4. Sharava Samputa Preparation: Place the dried chakrikas into a Sharava Samputa (earthen container) and seal it using Sandhi Lepa (clay sealant).
5. Heat the sealed Sharava Samputa using Gaja Puta.
6. Repeat the heating process until the bhasma passes all bhasma pariksha (quality tests).
7. Store the prepared Shankha Bhasma appropriately for use.

Dose

250- 300mg

Anupana

Nimbu Svarasa, Triphala Kvatha.

Properties

शङ्ख: सुशीतल: क्षारस्त्वम्लपित्तविनाशन:।
अग्निमान्द्यहरो बल्यो ग्राही ग्रहणिकाहर:।।
परिणामोत्थशूलघ्नस्तारुण्यपिडिकापह:।
विषदोषहरो वर्णो मात्रा गुञ्जद्वयोन्मिता।। (R.T. 12/20-21)
शङ्ख: क्षारो हिमो ग्राही ग्रहणीरोगनाशन:।
नेत्रपुष्यहरो वर्ण्यस्तारुण्यपिटिकाप्रणुत्।। (Ay.Pra. 2/262)

- **Rasa**: Katu, Kashaya
- **Guna**: Laghu, Shita
- **Virya**: Shita
- **Dosha**: Tridoshashamaka
- **Karma**: Balya, Varnya, Hridaya, Vilekhana, Grahi.
- **Therapeutic Uses**: Ajirna, Agnimantha, Grahani, Amlapitta, Parinama Shula, Yakritplihavriddha, Visha.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Breaking into smaller pieces for better interaction.
- Softening and surface cleaning through heating in acidic mediums.
- Improved texture and appearance.

b. Chemical Changes

- Citric acid reacts with calcium carbonate ($CaCO_3$), forming calcium citrate and releasing CO_2.
- Detoxification and infusion of medicinal properties.

During Marana Process

a. Physical Changes

- Dehydration and brittleness after drying and heating.
- Conversion to fine, white ash.

b. Chemical Changes

- Decomposition of $CaCO_3$ into calcium oxide (CaO) and CO_2.
- Formation of bioavailable and therapeutically potent compounds after repeated puta.
- Removal of organic impurities.

Importance of Temperature While Processing

During Shodhana Process

a. Controlled Heating in Dolayantra

- Gentle heating ensures efficient release of impurities without causing structural damage.
- Maintains the interaction between the acidic medium (e.g., Jambira Rasa) and calcium carbonate for detoxification.

b. Optimal Swedana (Steaming)

- Prolonged heating allows even penetration of the medium into the Shankha, enhancing purification.
- Prevents over-burning, which could compromise the therapeutic qualities.

During Marana Process

- **Gaja Puta (High Temperature)**: Converts calcium carbonate ($CaCO_3$) into calcium oxide (CaO) through decomposition.
  High temperature ensures complete combustion of organic impurities and uniform calcination.
- **Temperature Control in Multiple Puta**: Ensures gradual and thorough transformation into fine, bioavailable bhasma.
  Prevents under-processing (leaving impurities) or over-processing (causing loss of potency).
- **Cooling Phase**: Allows stabilization of the final chemical form. Prevents structural defects due to sudden thermal shock.

Yoga

1. Shankhadrava
2. Mahashankha vati
3. Kaphaketu rasa
4. Grahanikapata rasa
5. Pravalapanchamrta rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pharmaceutical Study of Shankha Bhasma By Two Different Methods	Dr. Arpita Sharma, P. G. Department of Rasa Shastra and Bhaishajya Kalpana, R.G.G.P.G. Ayurvedic College, Paprola.	The study prepared six batches of Shankha Bhasma, divided into two groups: Group A (Gajaputa at 900°C with Aloe Vera pulp) and Group B (open Marana followed by two Laghuputas at 600°C with Nimbu Svarasa). Both groups underwent a minimum of three putas to achieve Rekhapurna, Nirdhuma, and Avami Bhasma. Tongue Pareeksha indicated the Kshariya Guna. The yield was 45-50% for Group A and 78-80% for Group B. Group A's Bhasma was white, while Group B's was off-white. EDAX analysis revealed similar elemental composition (Ca, C, O, and Si) in both groups despite the different preparation methods.
2.	Physicochemical Evaluation of Shankha Bhasma- A Calcium-Enriched Ayurvedic Preparation.	Laxmi Narayana Gupta, Dept. RSBK, Faculty of Ayurveda, Institute of Medical Sciences, BHU, Varanasi-221005. U.P.	The EDAX study revealed an increase in the calcium percentage in Shankha Bhasma (45.90%) compared to raw Shankha (28.77%), suggesting its potential as a calcium supplement for therapeutic use. However, safety and toxicity concerns related to metal or mineral-based medicines have been raised by several researchers, highlighting the need for further safety studies. In conclusion, while Shankha Bhasma shows promise as a calcium supplement, comprehensive safety evaluations and further studies are essential for its therapeutic application.
3.	Evaluation of Relative Oral Bioavailability of Shankha bhasma Prepared by	Pranjali Dukare Department of Rasashastra & Bhaishajya Kalpana, Mahatma Gandhi Ayurveda	This study will prepare Shankha Bhasma using traditional Puta and gas flame heating methods. The products will undergo Bhasma Pariksha, including organoleptic, physicochemical, and microbial tests. A randomized, single-blind controlled trial with 90 healthy volunteers will

Sr.No.	Article Name	Author Name	Result
	Two Different Methods in Healthy Volunteers: A Study Protocol	College Hospital & Research Centre, Salod (H) Wardha, (MS). Datta Meghe Institute of Medical Sciences (Deemed to be university) Wardha, (MS), India	assess oral bioavailability, analyzed using t-tests, ANOVA, and descriptive statistics. Shankha Bhasma is expected to show normal pharmaceutico-analytical parameters and significant effects on bioavailability in healthy volunteers. The efficacy of Shankha Bhasma supports its potential as a calcium supplement with improved bioavailability.

Godanti (Gypsum)

Introduction

- Gypsum is a soft sulfate mineral, chemically represented as calcium sulfate dihydrate ($CaSO_4 \cdot 2H_2O$).
- Gypsum has been used historically as alabaster, a decorative stone prominent in Ancient Egypt for its artistic and architectural applications.
- It forms through evaporation processes or as a hydration product of anhydrite and is commonly classified as an evaporite mineral.
- The term "gypsum" originates from the Greek word "gypsos", which means "chalk" or "plaster."
- Gypsum extracted from the Montmartre quarries in Paris was historically processed into burnt gypsum, known as Plaster of Paris, for a variety of uses.
- Despite its long history of use in other contexts, gypsum was not mentioned in classical Ayurvedic texts before the 20th century. During this time, it was incorporated into Ayurvedic literature and categorized under the 'Shuddha Varga', a group of substances associated with purity and therapeutic properties.

Synonyms

गोदन्तिका च गोदन्ता गोदन्तं कथ्यते बुधैः।
तत्तु पाषाणजातीयं सौम्यं तालसमं न तत्।। (R.T. 11/237)

Godantika, Godanta and Godanta.

Mineralogical Identification

Properties	Identification
Chemical Name	Gypsum
Chemical Composition	$CaSO_4 \cdot 2H_2O$
Colour	Clear, Colourless, Grey
Cleavage	Perfect
Luster	Vitreous
Streak	White
Specific Gravity	2.3
Hardness	2
Fracture	Conchoidal
Tenacity	Sectile

Sources

1. Gypsum is found in beds with evaporite minerals like anhydrite and halite, especially in Permian and Triassic formations.
2. It also occurs in saline lakes and salt pans, notably in Texas and Louisiana.
3. Major global producers include Spain, Thailand, the U.S., Turkey, and Russia.
4. The largest gypsum crystal was found in Chile's Braden mine.
5. In the U.S., key deposits are in Virginia, Ohio, Iowa, Kansas, Texas, Nevada, and southern California.
6. In India, Rajasthan accounts for 99% of gypsum production, with Jammu and Kashmir and Gujarat contributing the rest.

Types

According to Modren Minerology

- Selenite
- Alabaste
- Satinspar

Grahya Lakshna

पत्राचितं सुमसृणं शरदिन्दुसुनिर्मलम्।
दीप्तप्रभं तु गोदन्तं ग्राह्यमत्र प्रकीर्तितम्।। (R.T. 11/238)

1. Godanti is a mineral substance characterized by multiple adjacent shiny layers, giving it a unique appearance.
2. It exhibits a white, lustrous glow, resembling the brilliance of the moon during the Sarada Rtu (autumn season).
3. Samples of Godanti with these specific qualities—white color and moon-like radiance—are considered therapeutically ideal (Grihya) for medicinal purposes.

Shodhana

गोदन्तं निम्बुनीरेण द्रोणपुष्पीरसेन वा।
यामार्द्धेनैव सुस्विन्नं विशुद्ध्यति न संशयः।। (R.T. 11/239)

1. Place the Godanti mineral in a clean cloth and tie it securely into a Pottali (bundle).
2. Suspend the pottali in a Dolayantra (traditional heating apparatus) containing either Nimbu Svarasa (lemon juice) or Dronapuspi Rasa (juice of Dronapuspi) as the liquid medium.
3. Place the Dolayantra on mild heat and carry out the Svedana (sweating/steaming) process for approximately 1.5 hours (Yamardha).
4. After heating, remove the pottali and carefully open it. Wash the Godanti inside with warm water to eliminate any residues.
5. Dry the cleaned Godanti completely and store it in a clean, airtight container. This ensures the preparation of shuddha Godanti suitable for therapeutic use.

Marana

शरावसम्पुटान्तःस्थं गोदन्तं सुविशोधितम्।
म्रियते पुटितं भस्म जायते शशिसुन्दरम्।। (R.T. 11/ 240)

1. Roughly pound the Godanti into smaller fragments to facilitate processing.
2. Place the pounded Godanti in a Sharava Samputa (earthen dish with a lid) and seal it properly to create an airtight environment.
3. Subject the Sharava Samputa to one Laghu Puta, using dry cow dung cakes as fuel to achieve the required heat.
4. Allow the Sharava Samputa to cool naturally. Once cooled, open the dish and collect the white Godanti Bhasma formed inside.
5. Triturate the collected bhasma to ensure a fine consistency. Store it in a clean, airtight container to maintain its quality and therapeutic efficacy.

Dose

गुञ्जैकतः समारभ्य गुञ्जात्रयमितं परम्।
गोदन्तं विनियुञ्जीत बलकालाद्यपेक्षया।। (R.T. 11/242)

Dose : 1- 3 ratti (125 mgs to 375 mgs)

Anupana

Honey, Tulasi Svarasa, Ghee, Sugar

Properties

गोदन्तं सुमृतं शीतं पित्तज्वरनिषूदनम्।
जीर्णज्वरहरं बल्यं दीपनं श्वासकासनुत्।। (R.T. 11/241)

- **Rasa**: Katu
- **Guna**: Laghu, Shita, Sukshma
- **Virya**: Shita
- **Vipaka**: Katu
- **Dosha**: Vata-pittahara
- **Karma**: Balya, Dipana
- **Therapeutic Indications**: Kasa, Shvasa, Jvara, Shirashula, Daha, Pradara Roga, Urakshata.

Probable Physico-Chemical Changes

a. During Shodhana Process

- **Physical Changes**: Removal of surface impurities, smoother texture, weight reduction.
- **Chemical Changes**: Decalcification through acidic mediums, detoxification, and removal of water-soluble impurities.

b. During Marana Process

- **Physical Changes**: Calcination transforms Godanti into a fine, white ash-like bhasma with a uniform texture.
- **Chemical Changes**: Dehydration of gypsum to anhydrous calcium sulfate ($CaSO_4$), stabilization of the material, and elimination of organic impurities.

Importance of Temperature While Processing

Importance of Temperature in the Processing of Godanti.

a. During Shodhana Process

- **Controlled Mild Heat**: Facilitates the release of surface impurities and water-soluble toxins. Ensures the structural integrity of Godanti while allowing effective interaction with acidic mediums like Nimbu Svarasa or Dronapuspi Rasa.
- **Avoiding Overheating**: Prevents premature calcination or undesired structural changes.

b. During Marana Process

- **Optimal Laghu Puta Temperature**: Ensures complete dehydration of gypsum to anhydrous

calcium sulfate ($CaSO_4$). Promotes uniform calcination to produce fine, bioavailable bhasma.

- **Controlled Cooling**: Prevents thermal stress and ensures a stable end product.

Yoga

1. Muktadi vati
2. Trailokyachintamani rasa
3. Balapanchabhadra rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Review of Analytical Study of Godanti Bhasma	Vd. Sachin Kalamkar, PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, PMT Ayurved Collage, Shevgaon, Dist. – Ahmednagar.	Godanti, used in Rasa Shastra for Dehavada, is purified with Nimbu and Dronpushi juice and processed using Neem or Grahitakumari juice for Marana. The process results in a 25% weight loss and can be done using traditional Puta or electric furnace methods. The mildly alkaline Bhasma ensures faster absorption and is beneficial for ulcer healing and as and antipyretic, though it lacks antibiotic-like properties.
2.	Toxicological and Pharmacological Assessment of Godanti Bhasma	Nidhi Dubey, College of Pharmacy, IPS Academy, Indore-452012, M.P. India.	Godanti Bhasma, an Ayurvedic herbal-mineral formulation, was tested for toxicity, antiulcer, and antipyretic activities in animals. Acute oral administration up to 2000 µg/kg body weight showed no mortality. It demonstrated significant protection against ulcers (44.72% in cold restraint stress model and 45.35% in diclofenac model, $p < 0.001$) and reduced TBARS levels in the stomach ($p < 0.001$), without affecting serum calcium levels. The Bhasma also significantly reduced hyperpyrexia ($p < 0.001$). These findings suggest significant gastroprotective and antipyretic effects, with no dose-dependent response ($p > 0.05$).
3.	Evaluation of The Efficacy of Godanti Bhasma in Shweta Pradara with Special Reference of Leucorrhoea- A Clinical Study	Dr Rudraxi A Malawad, .Professor, Dept of Rasashastra, Shri Veer Pulikeshi Rural Ayurvedic Medical College, Badami, Karnataka	In Group I, Godanti Bhasma provided 100% relief from symptoms like foul smell, vaginal itching, and lower limb weakness, with 80-95% improvement in other symptoms. Group III also showed significant improvement in leucorrhoea symptoms. Godanti Bhasma exhibited strong antifungal, antibacterial, anti-inflammatory, and haematinic properties, making it a cost-effective and safe choice for treating leucorrhoea.

Samudraphena (Cattle Fish Bone)

Introduction

- Cuttlebone, also referred to as cuttlefish bone or quill, is a rigid and brittle internal structure found in all members of the Sepiidae family, which includes cuttlefish.
- It is primarily composed of aragonite, a form of calcium carbonate.
- Cuttlebone serves as a buoyancy aid, utilizing its chambered and gas-filled structure for balance in the water.
- Its microscopic architecture consists of thin, layered chambers interconnected by numerous vertical pillars, providing strength and lightness.
- Depending on the species, cuttlebones are known to collapse under pressure at depths ranging from 200 to 600 meters (660 to 2,000 feet).
- Due to this depth constraint, most cuttlefish species inhabit shallow waters, typically residing on the continental shelf near the seafloor.

Synonyms

समुद्रफेनः फेनश्च सुफेनः फेनकस्तथा।
अब्धिफेनश्च फेनश्च डिण्डीरोऽब्धिकफो मतः।। (R.T. 12/110)

Samudraphena, Phena, Saphena, Phenaka, Abdhiphena, Dindira and Abdhikapha.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	Whitish
Specific Gravity	2.7
Hardness	3

Sources

1. Cuttlefish typically inhabit shallow reefs but can also be found in channels and deeper waters, reaching depths of up to 650 feet (approximately 200 meters).
2. These creatures are widely distributed across the globe.
3. They are commonly located in the oceans and seas surrounding Europe, Africa, Asia, and Australia.
4. Cuttlefish follow an annual migratory pattern within their natural habitat.
5. During summer months, they dwell in coastal waters within tropical or temperate zones.
6. In winter, they migrate to deeper oceanic waters.

Shodhana

पृष्ठास्थीन्यब्धिफेनस्य विलिख्यापनयेत्ततः।
खल्वे सम्पेष्य कृत्स्नेन श्लक्ष्णचूर्णञ्च कारयेत्।।
निम्बूकस्वरसेनाथ भावयेदेकवारकम्।
एवमब्धिकफः शीघ्रं शुद्धिमायात्यनुत्तमाम्।। (R.T. 12/111-112)

1. Scrape off any adhered saline and alkaline sea sediments from the Samudraphena (cuttlefish bone) to ensure it is thoroughly cleaned.
2. Place the cleaned Samudraphena in a Khalva Yantra (mortar and pestle) and pound it to produce a fine powder.
3. Add Nimbu Svarasa (lemon juice) to the powder. Triturate the mixture thoroughly for one full day to achieve uniform consistency.
4. Dry the triturated material completely to remove any moisture.
5. Collect the fine, dried powder and store it in a clean, airtight container. This ensures the purity and longevity of the prepared Shuddha Samudraphena.

Marana

Not Mentioned

Dose

Two ratti (500 mgs)

Anupana

Honey or Water

Properties

समुद्रफेनः शिशिरो लेखनः पाचनः सरः।
चक्षुष्यो दीपनश्चैव श्रुतिस्रावहरः परम्।।
विषदोषप्रशमनः कषायः कफनाशनः।
कुष्ठरोगहरोऽत्यर्थं मात्रा रक्तिद्वयोन्मिता।। (R.T. 12/113-114)

- **Rasa**: Kashaya
- **Guna**: Sara, Shita
- **Virya**: Shita
- **Dosha**: Kaphahara
- **Karma**: Lekhana, Pachana, Chakshushya, Visha Dosha.
- **Therapeutic Indications**: Netra Roga, Jvara, Shula, Visha, Kushta, Shula.

Probable Physico-chemical Changes

a. Physical Changes

1. Scraping eliminates adhered saline and alkaline sediments.
2. Pounding produces a fine powder with increased surface area.
3. Grinding with lemon juice creates a uniform, softened material.
4. Drying removes residual moisture, stabilizing the material.

b. Chemical Changes

1. Acidic lemon juice neutralizes alkaline salts.
2. Reacts with carbonates, releasing CO_2 and forming inert salts.
3. Forms bioavailable citrates and stable complexes.
4. Removes contaminants like heavy metals and excess salts.
5. Ensures chemical stability and suitability for medicinal use.

Importance of Temperature While Processing

a. During Shodhana Process

- Facilitates impurity removal by dissolving unwanted salts and contaminants.
- Enhances permeability for deeper purification.
- Prevents cracking or charring from overheating.

b. During Marana Process

- Ensures uniform calcination and conversion to bhasma.
- Promotes chemical transformations like decarbonation.
- Enhances medicinal properties by removing toxins.
- Prevents material degradation from excessive heat.

Yoga

1. Shankha Dravaka Rasa

2. Danta Varti
3. Mahanila Gutika
4. Dhumaketu Rasa
5. Shukavati Varti

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Literary Review of Samudraphena (Cuttlefish Bone)	Dr. Pramod kumar, K. L. E. University's Shri B. M. Kankanwadi Ayurved Mahavidyalaya, Belagavi, Karnataka	Samudraphena (Cuttlefish bone) has been used therapeutically since the Samhita period, with its medicinal properties widely recognized in ancient texts, particularly in Rasashastra under Pranija Sudha Varga. Composed mainly of calcium carbonate, it has been studied for its effects on conditions like otitis media and netrakusuma, demonstrating significant therapeutic potential.
3.	A Case Study on the Efficacy of Samudraphena Churna in the Management of Karnasrava (Csom)	Sangeeta Bala, PG Scholar, Shalakya Tantra Department, National Institute of Ayurveda, Jaipur, Rajasthan, India.	The Ayurvedic treatment of Karnasrava using Karnapichu with Samudraphena Churna showed positive results, proving to be an effective, economical, and easily accessible option. This study was conducted on a single patient, and further research with a larger sample size is recommended to confirm its efficacy.

Kukkutanda Tvak (Hen's Egg Shell)

Introduction

- Kukkutanda tvak, the shell of a hen's egg, is distinguished by its high calcium content, warranting its inclusion in shuddha varga.
- Despite their abundance, these shells are often discarded after eggs are used in culinary applications like cooking and baking.
- With their calcium-rich composition, they hold significant potential as an alternative mineral source. Interestingly, classical texts do not mention this natural resource, inviting curiosity about untapped possibilities.
- Exploring its benefits could pave the way for advancements in science, art, and industry.

Synonyms

Dakshinanda Tvak and Dimbha.

Shodhana

1. Immerse hen's egg shells in a sour or salty liquid, such as kanji or saline water, and leave them to soak for 3 to 4 hours.
2. After soaking, carefully peel away the sticky sheath lining the inner surface of the shells.
3. Clean the shells thoroughly and spread them out under direct sunlight until they are completely dry.
4. Once dried, store the shells in a clean, dry container for pharmaceutical use.

Marana

1. Take dry Shuddha Kukkutanda Tvak (purified eggshell) and place it in a clean Khalva Yantra (mortar and pestle).
2. Add Changeri Svarasa (juice of Changeri) or Ghritakumari Svarasa (juice of Aloe Vera) to the powdered eggshell. Triturate the mixture thoroughly until it attains a uniform consistency.
3. Shape the triturated mixture into small chakrikas (pellets) of even size and shape.
4. Dry the chakrikas under direct sunlight until they are completely moisture-free.
5. Place the dried cakrikas in a Sharava Samputa (earthen dish with a lid) and seal it properly.
6. Subject it to one Laghu Puta, using 8 to 10 dry cow dung cakes as fuel.
7. Allow the setup to cool naturally. Once cooled, collect the resultant product, which is a white, smooth, and soft Kukkutanda Tvak Bhasma.
8. Store the prepared bhasma in a clean, airtight container to maintain its purity and efficacy.

Dose

2 - 4 Ratti (250 mgs to 500 mgs)

Anupana

Honey, Butter, Sugar.

Properties

Doshaghnata: Kaphavatahara

Karma: Rasyana, Hrudya, Balya, Dipana, Pachana

Therapeutic Indications: Rakta Pradara, Swapnadosha, Bahumutra, Mastishka Roga, Prameha, Somaroga.

Probable Physico-Chemical Changes

a. During Shodhana Process

Physical Changes

- Softens and removes the inner sheath, eliminates impurities, and sun-dries the shells for storage.

Chemical Changes

- Dissolves organic impurities and neutralizes surface alkalinity via reactions with acidic or salty liquids.

b. During Marana Process

Physical Changes

- Reduces size to fine powder, ensures uniform consistency, forms pellets, and transforms structure into soft bhasma through calcination.

Chemical Changes

- Converts calcium carbonate ($CaCO_3$) to calcium oxide (CaO) by releasing CO_2.
- Formation of bioavailable calcium salts with Changeri or Aloe Vera juice.
- Removes volatile impurities and stabilizes the final product as medicinal bhasma.

Importance of Temperature While Processing

a. During Shodhana Process

- **Facilitates Sheath Removal**: Warm or ambient temperatures in the soaking liquid aid in softening the inner sheath, making it easier to remove impurities.
- **Prevents Damage**: Controlled temperature ensures the shell structure remains intact without over-softening or dissolving.

b. During Marana Process

- **Enables Calcination**: High temperatures during Laghu Puta facilitate the conversion of calcium carbonate ($CaCO_3$) to calcium oxide (CaO), an essential step in bhasma preparation.
- **Ensures Uniform Transformation**: Consistent heating avoids incomplete or uneven calcination, ensuring all pellets are properly processed.
- **Eliminates Organic Impurities**: Sufficient heat burns off residual organic matter and volatile components, purifying the material.
- **Stabilizes the Final Product**: Gradual cooling after calcination enhances the stability and efficacy of the bhasma.

Yoga

1. Muktadi Anjana
2. Kuttutanda Tvak Bhasma
3. Drishti Prasadana Varti

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review on Kukkutanda Twak Bhasma	Dr. Namitha. R. Chandra, 2nd Year PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India.	The study highlights that Kukkutanda (Hen's egg shell) is widely used as a food material and in therapeutic applications as Kukkutanda Twak Bhasma. Classified under Sudha Varga, it is rich in calcium compounds, and its organic form offers higher bioavailability compared to inorganic calcium. The article discusses its composition, purification (Shodhana), incineration (Marana), dosage, adjuvants (Anupana), and therapeutic indications, demonstrating its potential as an effective calcium source in Ayurvedic medicine.
2.	Analytical Study of Kukkutanda Twak Bhasma (Incinerated hen egg shell)	Rakesh Kumar Singh, Dept. of RSBK, Govrmnet Ayurveda College, Raipur, Chhattisgarh, India.	Two samples of Kukkutanda Twak Bhasma (KTB) were prepared using Kumari Svarasa (KTB-A) and Hingula (KTB-B) in an electric muffle furnace. Analysis showed KTB-A contained 22.75% calcium and 0.29% magnesium, while KTB-B had 41.16% calcium and 0.15% magnesium. Both samples contained calcium hydroxide (Ca(OH)2). The average particle sizes were 9.35 µm and 9.97 µm, with XRD revealing the presence of calcium carbonate and calcium hydroxide in the Bhasma.
3.	Clinical effect of Kukkutanda Twak Bhasma in the management of Swetapradara	Gatikrushna Panda, Assistant Professor, Department of Prasuti Tantra and Streeroga, M.S.M. Institute of Ayurveda, B.P.S. Mahilla University, Sonipat, Haryana, India	Statistical analysis showed that Kukkutanda Twak Bhasma significantly treated major symptoms of Swetapradara (discharge, itching, consistency, pH, pus cells) with a P value of <0.001. Anemia cases showed significant improvement in hemoglobin levels ($P < 0.001$), likely due to calcium and magnesium content. However, backache and bad odor had less significant improvement ($P < 0.005$ and $P < 0.05$, respectively). Overall, 30% of patients were completely cured, 26.7% showed maximum improvement, 20% had moderate improvement, and 23.3% had mild improvement.

Tankana (Borax)

Introduction

- Borax, also referred to as sodium borate, sodium tetraborate, or disodium tetraborate, is a significant boron compound known for its mineral and salt properties.
- Typically found as a soft, white, powdery substance composed of colorless crystals, borax easily dissolves in water.
- Its versatility allows it to serve as an essential ingredient in detergents, cosmetics, and enamel glazes.
- In biochemistry, it is utilized for creating buffer solutions, while in metallurgy, it acts as a flux.
- Borax also finds applications as a fire retardant, an antifungal agent for fiberglass, and a texturing agent in cooking, among other uses.
- Commercial borax generally refers to its decahydrate form, though partially dehydrated variants are common.
- The compound has ancient roots in traditional medicine and alchemy, being mentioned in Samhita texts and extensively used in Ayurvedic formulations like Tankana kshara.
- It has significant relevance in mercury-based pharmaceutical processes and as an antidote in treating poison cases.

Synonyms

टङ्कणष्टङ्कनश्चैव टङ्कष्टङ्गश्च टङ्गण:।
द्रावकष्टङ्कणक्षारष्टङ्कक्षारश्च कथ्यते।।
रङ्क्षारस्तथा रङ्गो रङ्गदो लोहशोधन:।
लोहशोधनकश्चापि कीर्तित: स्वर्णशोधन:।।
सौभाग्यश्च सितक्षार: श्वेतक्षारश्च टङ्ककः।
क्षारराजश्च कथितो रसायनविशारदै:।। (R.T. 13/72-74)

Tankana, Tankana, Tanka, Tanga, Tangana, Dravaka, Tankana-kshara, Ranga-Kshara, Ranga, Rangada, Loha-Shodhana, Svarna-Shodhana, Saubhagya, Sitakshara, Shveta- Kshara, Tangaka and Kshararaja.

Mineralogical Identification

Properties	Identification
Chemical Name	Borax
Chemical Composition	$Na_2B4O_7 \cdot 10H_2O$
Colour	Colorless, Grey, Green
Cleavage	Perfect
Luster	Greasy
Streak	White
Specific Gravity	1.7 – 1.75
Hardness	2.2 – 5
Fracture	Conchoidal
Tenacity	Brittle
Transparency	Translucent to Opaque

Sources

- Borax was initially discovered in the dry lake beds of Tibet and was transported to Arabia through the historic Silk Road trade route.
- Its widespread use began in the late 19th century, driven by the efforts of Francis Marion Smith and his Pacific Coast Borax Company.
- The company popularized borax under the well-known 20 Mule Team Borax brand, showcasing its diverse applications.
- The brand name originated from the method used to transport borax—20-mule teams that hauled large quantities from the deserts of California and Nevada.
- This efficient transportation method made borax affordable and widely available for everyday use, significantly boosting its popularity.

Types

1. **Tankana**: White coloured (common variety)
2. **Nila Tankana**: Blue coloured (special variety and Shrestha)

Doshas

Asuddha Tankana Sevanajanya Dosha

अशुद्धष्टङ्कणो वान्ति भ्रान्तिकारी प्रयोजित:।

(Ay.Pra. 2/244)

Vamana and Bhrama.

Shodhana

Method 01

सुचूर्णितं टङ्कणं तु खलु पञ्चपलोन्मितम्।
समुज्ज्वलोदरे क्षुद्रकटाहे विन्यसेत्तत:।।
चुल्लिकायां निधायाथ पचेद् दर्व्या प्रचालयन्।
सुपुष्पितं नष्टनीरं शुद्धिमायाति टङ्कणम्।। (R.T. 13/77-78)

1. Take five pala (approximately 250 grams) of tankana (borax).
2. Use a clean, wide-mouthed iron vessel (kadhahi).
3. Place the vessel over a fire and begin heating.
4. Stir the contents regularly to ensure even heating and prevent sticking.
5. Continue heating until all moisture evaporates, and the tankana becomes light and brittle, resembling popped corn.
6. Remove the vessel from the heat once the desired texture is achieved.
7. Allow the substance to cool completely.
8. Transfer the prepared shuddha tankana to a suitable, dry container for storage and future use.

Method 02

टङ्कणं चूर्णितं तोये तत्त्वसङ्ख्यगुणे भिषक्।
सद्रव्य वस्त्रपूतञ्च कृत्वा चुल्ल्यां निधापयेत्।।
तीव्राग्निना पचेत्कामं नीरं च परिशोषयेत्।
स्वल्पनीरांशशेषे च टङ्कणं निर्मलं हरेत्।। (R.T. 13/75-76)

1. Take one part of tankana (borax) and dilute it with 24 parts of clean water.
2. Filter the solution once to remove impurities.
3. Collect the filtrate in a clean stainless steel vessel.
4. Place the vessel on a mild fire and begin boiling the solution.
5. Allow the liquid to evaporate slowly while stirring occasionally to prevent sticking.
6. Continue heating until a thick, concentrated solution remains at the base of the vessel.
7. Remove the vessel from heat and spread the concentrated material under the sun to dry completely.
8. Once dried, transfer the resultant material (boric acid) into a clean, dry container for storage and future use.

Marana

Not Required

Dose

1- 2 Ratti

Anupana

Honey, Ghrita, Milk, Water.

Theraputic Uses

Kaphadravaka, Adhmari, Kasa, Shvasa, Adhymana, Varna nashaka.

Properties

टङ्कण: कटुरुष्णश्च रूक्षस्तीक्ष्णश्च सारक:।
कफविश्लेषणो ह्यद्यो वातामयनिषूदन:।।
कास श्वासहर: कामं स्थावरादिविषापह:।
अग्निदीप्तिकरश्चापि भृशमाध्माननाशन:।।
स्त्रीपुष्पजननो बल्यो विविधव्रणनाशन:।
पित्तकृच्च समाख्यातो मूढगर्भप्रवर्तक:।। (R.T. 13/79-81)

- **Rasa**: Katu
- **Guna**: Ruksha, Tikshana, Saraka
- **Virya**: Ushna
- **Dosha**: Kapha- Vatahara
- **Karma**: Dipana, Balya, Vrananashana, Vrishya.
- **Therapeutic indications**: Kasa, Shvasa, Adhyamana, Mudha Garbha, Agnimandya.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

1. Heating evaporates water content, making tankana light and brittle.
2. Granules expand and resemble popped corn.
3. Filtration and boiling remove insoluble impurities.
4. Marana further reduces particle size.

b. Chemical Changes

1. Removes water of crystallization, converting borax ($Na_2B_4O_7 \cdot 10H_2O$) to anhydrous borax ($Na_2B_4O_7$).
2. In Method 2, creates boric acid (H_3BO_3) in aqueous medium.
3. Heating eliminates organic and volatile impurities.
4. Thermal processing ensures purity and enhances medicinal efficacy.

Importance of Temperature While Processing

a. During Shodhana Process

- Adequate heat removes water of crystallization, converting hydrated borax ($Na_2B_4O_7 \cdot 10H_2O$) to anhydrous borax ($Na_2B_4O_7$).
- Controlled heating ensures tankana becomes light and brittle, aiding in its later processing and use.
- High temperatures drive off volatile impurities and unwanted organic residues.
- Excessive heat can degrade borax, causing loss of its medicinal and chemical properties.

- Consistent heating prevents uneven dehydration or partial processing, ensuring uniform quality.

Yoga

1. Ananadabhairava rasa
2. Pratapalankeshvara rasa
3. Mrityunjaya rasa
4. Sannipatabhairava rasa
5. Trailokyachintamani rasa
6. Tankanamrita malahara

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Comperehencive review of Tankana	Dr. Jyotsna Sankpal, Post Graduate Scholar, Department of Rasa Shastra & Bhaishajya Kalpana, Faculty of Ayurveda, LRBP Ayurvedic Medical College, Walva, Islampur, Maharashtra, India.	For the Shodhana (purification) of Tankana, the external heat method is a simpler and more cost-effective approach. However, for targeting specific conditions like Agnimandya, Ajirna, and Atisara, the Rasa Sara Sangraha method should be prioritized. Tankana also shows notable efficacy in treating menstrual disorders and prolonged labor, with further potential for research in these areas.
2.	Tankana (Borax): It's Therapeutic Value in Gynecology	Anubha Chandla, Dept. of Stri Roga Evum Prasuti Tantra, SKSS Syurvedic College & Hospital Sarabha, Ludhiana, Punjab, India.	Tankana, a kshara, has therapeutic properties such as reducing pruritus, killing microorganisms, and aiding wound healing. It is effective in treating amenorrhea, stimulating uterine contractions in prolonged labor, and managing vaginal infections like leucorrhea. Its antiseptic and antifungal properties align with both Ayurvedic and modern scientific findings, supporting its use in female reproductive health.

Multiple Choice Questions

1. **What is the scientific name of Parada?**
   a. Argentum b. Hydrargyrum
   c. Aurum d. Ferrum
2. **Which of the following acids does mercury react with to form mercuric sulfate?**
   a. Hydrochloric acid (HCl)
   b. Diluted Nitric acid (HNO_3)
   c. Concentrated Sulfuric acid (H_2SO_4)
   d. Acetic acid
3. **In Indian mythology, Parada is considered as:**
   a. The tears of Lord Shiva
   b. The blood of Goddess Parvati
   c. The semen (Virya) of Lord Shiva
   d. The sweat of Lord Vishnu
4. **What is the atomic number of mercury?**
   a. 79 b. 80 c. 82 d. 78
5. **Which form of mercury ore is most commonly mined?**
   a. Livingstonite b. Corderoite
   c. Cinnabar (HgS) d. Amalgam
6. **Which of the following is not considered a type of Parada impurity (Dosha)?**
   a. Naisargika b. Yougika
   c. Kalpita d. Aupadhika
7. **What is the specific gravity of mercury?**
   a. 7.85 b. 10.5
   c. 13.55 d. 19.3
8. **According to Dhatuvada, which synonym refers to Parada?**
   a. Prabhu b. Divyarasa
   c. Achintaya d. Paramamrita
9. **Which dosha classification involves impurities from commercial processing, like the addition of lead or tin?**
   a. Naisargika b. Yaugika
   c. Aupadhika d. Parpati
10. **What method is used to purify mercury from Hingula (cinnabar)?**
    a. Adhah Patana b. Gajaputa
    c. Bhudhara Yantra d. Svedana
11. **What is the primary medicinal use of Abhraka in Ayurveda?**
    a. Treatment of fever
    b. Preparation of artificial gold
    c. Skin rejuvenation
    d. Pain relief

12. **Which ancient text first references Abhraka (Vajrabhraka)?**
    a. Ashtanga Hridaya b. Nyayadarshana
    c. Kautilya's Arthashastra d. Amarakosha
13. **Which of the following properties is NOT characteristic of Abhraka?**
    a. Perfect cleavage b. Opaquetransparency
    c. Hardness of 7-8 d. Vitreous luster
14. **What is the significance of the "pinaka" variety of Krishnabhraka?**
    a. It is safe for therapeutic use.
    b. It produces frog-like sounds when heated.
    c. It splits into pieces when exposed to fire.
    d. It remains unchanged when exposed to fire.
15. **What is the ideal appearance of high-quality Abhraka according to its Grahya Lakshana?**
    a. Dull and rough texture
    b. Dark appearance resembling nilanjana
    c. Bright yellow color
    d. Transparent and fragile
16. **What is the chemical composition of Svarna Makshika (Chalcopyrite)?**
    a. FeS b. $CuFeS_2$
    c. Ag d. Au
17. **In which ancient Ayurvedic text is Makshika first mentioned?**
    a. Sushruta Samhita b. Charaka Samhita
    c. Ashtanga Hridaya d. Yoga Ratnakara
18. **Which of the following is NOT a characteristic of Rajata Makshika?**
    a. Exhibits a silver-like shine
    b. Displays a prominent golden color
    c. Has a heavy, dense composition
    d. Typically round or rounded in form
19. **Which method is used to purify Svarna Makshika according to Ayurveda?**
    a. Boiling in water
    b. Heating and quenching in Triphala kvatha
    c. Exposure to sunlight
    d. Mixing with honey
20. **Which of the following is a synonym for Rajata Makshika?**
    a. Hema Makshika b. Suvarna Makshika
    c. Vimala Makshika d. Kamsya Makshika
21. **What is Shilajatu primarily derived from?**
    a. Animal fat b. Mineral deposits
    c. Plant extracts d. Essential oils
22. **Which of the following is a synonym for Shilajatu?**
    a. Saptaparna b. Ashmaka
    c. Shailaja d. Vata
23. **What is the main therapeutic action of Shilajatu?**
    a. Anesthetic b. Antipyretic
    c. Rasayana (rejuvenating) d. Analgesic
24. **According to Ayurveda, what are the two types of Shilajatu mentioned?**
    a. Red and Green b. Gomutragandhi and Karpuragandhi
    c. Solid and Liquid d. Pure and Impure
25. **What should Shilajatu exhibit when placed on glowing charcoal?**
    a. Emit a strong fragrance
    b. Smoke heavily
    c. Melt and expand into the shape of a linga
    d. Burst into flames
26. **What is the primary characteristic of Gandhaka (sulfur) that makes it significant in Ayurveda?**
    a. It is a sweet-tasting mineral.
    b. It is the foremost mineral drug in the uparasa group.
    c. It is a rare gemstone.
    d. It is primarily used for its color.
27. **Which of the following best describes the physical state of native sulfur?**
    a. Odorous and tasteless
    b. Yellow, crystalline, and tasteless
    c. Colorless and odorless
    d. Red and solid
28. **What is the ideal characteristic of high-quality Gandhaka as per Ayurveda?**
    a. Dark brown color and rough texture
    b. Yellowish-green hue and buttery softness
    c. Transparent and brittle
    d. Dull gray color and hard texture
29. **In Ayurveda, what is the recommended Anupana (vehicle) for the consumption of purified Gandhaka?**
    a. Water b. Cow's milk
    c. Ghee d. Honey

30. **Which therapeutic uses are associated with Gandhaka (sulfur) in Ayurveda?**
    a. Kushtha (skin diseases) and Kandu (itching)
    b. Heart disease and diabetes
    c. Respiratory issues and digestive problems
    d. Bone fractures and muscle pain
31. **What is Gairika primarily identified as in terms of mineral composition?**
    a. Hematite b. Calcite
    c. Quartz d. Gypsum
32. **Which of the following colors is NOT associated with Gairika (Haematite)?**
    a. Black b. Reddish-brown
    c. Green d. Steel-grey
33. **What are the two main types of Gairika mentioned in Ayurvedic texts?**
    a. Svarna Gairika and Raktagairika
    b. Pashana Gairika and Svarna Gairika
    c. Raktagairika and Kevala Gairika
    d. Pashana Gairika and Rakta Gairika
34. **Which therapeutic property is attributed to Svarna Gairika according to Ayurvedic texts?**
    a. It is heating (Ushna)
    b. It promotes hair growth (Keshya)
    c. It is cooling (Shita)
    d. It increases appetite (Apetit)
35. **What is the method of purification Shodhana. for Gairika using cow's milk called?**
    a. Bhavana b. Sveda
    c. Shodhana d. Churnana
36. **What is the chemical composition of Kankshi (Alum)?**
    a. $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$
    b. NaCl
    c. $CaCO_3$ d. $MgSO_4$
37. **Which of the following properties of Kankshi indicates its acidic nature?**
    a. Turns litmus paper blue
    b. Turns litmus paper red
    c. Has a basic pH
    d. Is insoluble in water
38. **What is the primary therapeutic use of Kankshi as mentioned in Ayurvedic texts?**
    a. Treating skin diseases
    b. Enhancing digestion
    c. Alleviating eye disorders
    d. Neutralizing poison effects
39. **What is the method for purifying Kankshi using Bhringraja rasa?**
    a. Immersing in kanji for three days
    b. Bhavana with Bhringaraja rasa three times
    c. Heating in a sharava samputa
    d. Soaking in water for 24 hours
40. **Which of the following describes the two types of Sphatika?**
    a. Phalaki is heavy and soft; Phullika is light and white.
    b. Phalaki is light and yellow; Phullika is heavy and white.
    c. Both are bright red and hard.
    d. Both are equally effective in treating all types of diseases.
41. **What is the chemical composition of Haratala (Orpiment)?**
    a. As_2O_3 b. As_2S_3
    c. AsS d. As_4S_4
42. **Which of the following is a synonym for Haratala?**
    a. Talaka b. Nata-bhushana
    c. Chitra-gandhaka d. All of the above
43. **Which type of Haratala is characterized as "lacks luster" and is deemed unsuitable for therapeutic purposes?**
    a. Patra Haratala b. Pinda Haratala
    c. Sattva Haratala d. Vata Haratala
44. **What is the primary therapeutic use of Patra Haratala?**
    a. Treating respiratory disorders
    b. Balancing all three doshas
    c. Enhancing memory
    d. Treating kidney stones
45. **What is the dose range recommended for Haratala according to traditional texts?**
    a. 1 - 2 ratti b. 1/4th – ½ ratti
    c. 1 - 5 ratti d. 1/2 – 1 ratti
46. **What is the chemical formula for Manahshila?**
    a. AsS b. As_2S_2
    c. As_2O_2 d. S_8
47. **Which of the following is NOT a synonym for Manahshila?**
    a. Rogashila b. Kalyanika
    c. Haratala d. Nagajihvika

48. **What are the major byproducts released when Manahshila is heated to high temperatures?**
    a. Carbon dioxide and water
    b. Sulfur dioxide and Arsenic trioxide
    c. Hydrogen and nitrogen
    d. Oxygen and sulfur
49. **What is the recommended internal dosage of purified Manahshila according to the text?**
    a. 1/8 – 1/4 ratti b. 1/16 – 1/8 ratti
    c. 1/32 – 1/16 ratti d. 1/4 – 1/2 ratti
50. **Which therapeutic indications are associated with the use of Manahshila?**
    a. Diabetes and hypertension
    b. Kasa, Shvasa, and Jvara
    c. Headaches and migraines
    d. Bone fractures and joint pain
51. **What is the scientific name of Kampillaka?**
    a. Euphorbia tirucalli
    b. Mallotus philippinensis
    c. Ficus carica
    d. Papaver somniferum
52. **Which Ayurvedic text is NOT mentioned in the references to Kampillaka's use?**
    a. Charaka Samhita b. Sushruta Samhita
    c. Ashtanga Hridaya d. Bhavaprakasha
53. **What is the primary therapeutic action of Kampillaka?**
    a. Anodyne b. Anti-inflammatory
    c. Rechana (purgative) d. Antiseptic
54. **What are the predominant dosha effects of Kampillaka?**
    a. Vata-pitta b. Kapha-vata
    c. Pitta-kapha d. Kapha-pitta
55. **In which geographical region is Kampillaka primarily found?**
    a. Himalayas b. Southeast Asia
    c. Arctic regions d. North America
56. **What is the chemical formula of Navasadara?**
    a. NH_4Cl b. NaCl
    c. KCl d. $CaCl_2$
57. **In which regions is Navasadara commonly found?**
    a. North America
    b. Italy, Sicily, and Central Asia
    c. Australia and New Zealand
    d. Southeast Asia
58. **Which characteristic is NOT associated with Navasadara?**
    a. Colorless, white crystalline salt
    b. Mildly alkaline solution
    c. Highly soluble in water
    d. Poor cleavage
59. **What are the predominant therapeutic actions of Navasadara?**
    a. Anti-inflammatory and analgesic
    b. Netrya (eye health) and Dipana (appetizer)
    c. Antimicrobial and antipyretic
    d. Diuretic and laxative
60. **What is the method for preparing Shuddha Navasadara according to Ayurvedic practice?**
    a. Boiling in milk
    b. Mixing with ghee and frying
    c. Dissolving in water and filtering
    d. Directly using from the source without processing
61. **What is the chemical composition of Hingula, also known as Cinnabar?**
    a. HgO b. HgS
    c. H_2S d. $HgCl_2$
62. **Which of the following is NOT a therapeutic indication for Hingula?**
    a. Jvara (fever)
    b. Amavata (rheumatoid arthritis)
    c. Diabetes
    d. Kushtha roga (skin diseases)
63. **What color is Hingula primarily associated with?**
    a. Blue b. Green
    c. Brick Red d. Yellow
64. **Which method involves the use of Nimbu Svarasa (lemon juice) for purifying Hingula?**
    a. Method 01 b. Method 02
    c. Both methods d. Neither method
65. **What is the recommended dose of Hingula for therapeutic use?**
    a. 1-2 Ratti b. ½ - 1 Ratti
    c. 2-3 Ratti d. 3-4 Ratti
66. **What is the chemical symbol for gold?**
    a. Au b. Ag
    c. Pb d. Fe

67. **Which ancient texts mention the therapeutic uses of gold (Svarna)?**
a. Bhagavad Gita
b. Charaka Samhita and Sushruta Samhita
c. Mahabharata
d. Arthashastra

68. **What is one of the characteristics of pure gold as described in the text?**
a. Hard and brittle
b. Light weight compared to other metals
c. Exhibits a reddish-yellow brilliance
d. Opaque with multiple layers

69. **What are the potential effects of Ashuddha (impure) gold according to Ayurveda?**
a. Enhances vitality and memory
b. Causes Balasya (loss of strength) and can lead to death
c. Improves digestion and metabolism
d. Increases energy levels

70. **Which of the following is NOT listed as a therapeutic use of gold (Svarna)?**
a. Amlapitta (hyperacidity)
b. Diabetes
c. Rajayakshma (tuberculosis)
d. Buddhikshaya (loss of intellect)

71. **What is the atomic number of silver (Rajata)?**
a. 45 b. 47
c. 49 d. 53

72. **Which of the following is NOT a synonym for Rajata (Silver)?**
a. Chandraloha b. Ruchira
c. Tamala d. Rupaka

73. **What is the primary method of extraction for silver?**
a. From copper ores b. From gold ores
c. From lead ores d. Both A and C

74. **Which of the following properties describes the ideal quality of Rajata (Silver) according to Ayurvedic texts?**
a. Dirty when heated b. Smooth and shiny
c. Lightweight d. Brittle

75. **What is the therapeutic use of Rajata (Silver) in Ayurveda?**
a. Promotes weight loss
b. Balances Vata and Kapha
c. Treats skin diseases
d. Enhances memory

76. **What is the chemical symbol for copper, derived from its Latin name?**
a. Cu b. Co
c. Fe d. Ag

77. **Which of the following is a characteristic of high-quality Tamra (copper)?**
a. Pale color b. Brittle texture
c. Smooth and soft surface d. Flaky appearance

78. **Which Ayurvedic text mentions the visha lakshana (toxic characteristics) of Tamra?**
a. Charaka Samhita b. Sushruta Samhita
c. Ashtanga Hridaya d. Bhavaprakasha

79. **What are the two types of Tamra (copper) mentioned in the texts?**
a. Shuddha and Ashuddha
b. Nepalika and Mlechchha
c. Pure and Impure
d. Raktaka and Shuddha

80. **Which process is used to purify impure Tamra (copper) according to Ayurvedic practices?**
a. Boiling in water
b. Heating and quenching in Kanji
c. Grinding with herbs
d. Soaking in oil

81. **What is the chemical symbol for iron, as referred to in Ayurveda?**
a. Au b. Ag
c. Fe d. Cu

82. **Which type of Loha is described as having sharp properties and is used to prepare weapons?**
a. Munda Loha b. Tikshna Loha
c. Kanta Loha d. Shuddha Loha

83. **Which method involves heating iron foils coated with a paste of Saindhava Lavana before immersing them in Triphala Kvatha?**
a. Bhanupaka b. Sthali Paka
c. Putapaka d. Shodhana

84. **What is one of the doshas associated with the consumption of asuddha Loha Bhasma according to Ayurvedic texts?**
a. Utkleda (nausea)
b. Prakriti (constitution)
c. Dhatu (tissue)
d. Agni (digestive fire)

85. **Which of the following states in India is NOT mentioned as rich in iron resources?**
a. Odisha b. Punjab
c. Kerala d. Karnataka

86. **What is the chemical composition of Mandura?**
a. Fe_2O b. Fe_2O_3
c. Fe_3O_4 d. FeO_4

87. **According to Ayurveda Prakasha, which type of Mandura is considered the best (sarva-shrestha)?**
a. Mandura aged 50 years
b. Mandura aged 60 years
c. Mandura aged 70 years
d. Mandura aged 100 years

88. **What is the primary heat source recommended for Mandura Shodhana in Ayurveda?**
a. Dry Bibhitaki branches or charcoal
b. Coal furnace
c. Electric heating device
d. Natural sunlight

89. **What is the correct sequence for Mandura Marana according to the Rasamrita?**
a. Heating→Powdering→Firing once
b. Grinding with Kumari Svarasa→Drying Gajaputa (seven times)
c. Crushing→Direct usage
d. Soaking in water→Sun drying

90. **Which of the following therapeutic properties is NOT associated with Mandura?**
a. Vrishya (Aphrodisiac)
b. Shoshahara (Anti-emaciation)
c. Vatahara (Pacifies Vata dosha)
d. Agnidipana (Digestive stimulant)

91. **What is the primary ore of Vanga (Tin)?**
a. Hematite b. Cassiterite
c. Galena d. Pyrite

92. **What is the Sanskrit synonym for Vanga that means "silver-like metal"?**
a. Kurupya b. Shuklaloha
c. Trapusha d. Mishraka

93. **Which purification method for Vanga involves the use of limewater (Churnodaka)?**
a. Jarana b. Shodhana
c. Marana d. Amritikarana

94. **What is the recommended dose of Vanga Bhasma?**
a. 10-20 mg b. 50-100 mg
c. 125-250 mg d. 500-750 mg

95. **What is the characteristic feature of Khuraka Vanga as per classical texts?**
a. High melting point and rough surface
b. Greyish hue and hardness
c. Bright silver-like shine and softness
d. Mixed with other metals

96. **What is the primary ore of Naga (Lead)?**
a. Galena b. Cassiterite
c. Anglesite d. Cerussite

97. **What is the process of purifying Naga (Lead. called in Ayurveda?**
a. Marana b. Shodhana
c. Mardana d. Jarana

98. **Which Sanskrit synonym of Naga refers to its snake-like appearance?**
a. Shisaka b. Nagaka
c. Kurunga d. Sindura-karana

99. **What is the recommended dose of purified Naga Bhasma?**
a. 1-5 mg b. 31-125 mg
c. 250-500 mg d. 1-2 g

100. **What is the primary guna (property) of Naga Bhasma?**
a. Laghu and Ruksha b. Guru and Snigdha
c. Tikshna and Sara d. Kapha and Ushna

101. **What is the primary mineralogical identification of Yasada in Ayurveda?**
a. Copper b. Lead
c. Zinc d. Iron

102. **What is considered Grahya Yashada according to classical Ayurvedic texts?**
a. Zinc that is lightweight and rough in texture
b. Zinc with a dull appearance and hard to melt
c. Zinc with a shiny, smooth surface, and melts quickly
d. Zinc that contains impurities and is brittle

103. **Which method is used for the Shodhana (purification) of Yashada using limewater?**
a. Nirvapa in Taila
b. Dipping molten Yashada in limewater 7 times
c. Heating Yashada with herbal decoctions
d. Mixing Yashada with Gandhaka and heating

104. **Which of the following is NOT a property of Yashada Bhasma?**
a. Kapha-Pittahara
b. Ushna Virya

c. Katu Vipaka
d. Chakshushya (beneficial for eyes)

105. What is the recommended dose of Yashada Bhasma as per classical texts?
a. 500 mg - 1 gm
b. 250 mg - 500 mg
c. 62 mg - 125 mg
d. 1 gm - 2 gm

106. What is the chemical composition of Mukta (pearl)?
a. Calcium Sulfate ($CaSO_4$)
b. Calcium Carbonate ($CaCO_3$)
c. Sodium Carbonate (Na_2CO_3)
d. Calcium Hydroxide [$Ca(OH)_2$]

107. Which of the following is NOT a synonym for Mukta?
a. Shuktija
b. Shashiratna
c. Chandraprabha
d. Mauktika

108. According to Ayurvedic texts, which of the following is a grahya lakshana (acceptable characteristic. of Mukta?
a. Rough and irregular surface
b. Shveta (pure white) appearance
c. Blackish discoloration
d. Small, fragmented particles

109. What is the primary purpose of performing Shodhana (purification) of Mukta?
a. Enhance its color
b. Remove impurities and make it suitable for pharmaceutical use
c. Reduce its hardness for easy processing
d. Change its chemical composition

110. Which anupana (vehicle) is recommended for the administration of Mukta Pishti?
a. Honey, Butter, Milk
b. Ghee, Water, Lemon Juice
c. Sugar Syrup, Oil, Buttermilk
d. Herbal Decoction, Vinegar, Alcohol

111. Which chemical compound primarily constitutes Pravala (coral)?
a. Calcium Oxide (CaO)
b. Calcium Carbonate ($CaCO_3$)
c. Magnesium Carbonate ($MgCO_3$)
d. Silicon dioxide (SiO_2)

112. What is the therapeutic property of Pravala mentioned in Rasashastra?
a. Pitta aggravator
b. Tridosha shamak (Pacifies all three doshas)
c. Kapha-Vata shamak
d. Only Kapha shamak

113. Which method is used for the Shodhana (purification) of Pravala involving Jayanti Svarasa?
a. Boiling in cow's milk
b. Dolayantra steaming with Jayanti Svarasa
c. Grinding with rose water
d. Sun drying after washing

114. What is the recommended dosage of Pravala Bhasma for therapeutic use?
a. 100–500 mg
b. 250–500 mg
c. 31–250 mg
d. 1–2 grams

115. Which of the following is NOT a property of Pravala as per Rasashastra?
a. Madhura rasa
b. Dipana (Appetizer)
c. Ushna virya (Hot potency)
d. Rakta pitta shamana (Alleviates bleeding disorders)

116. Which of the following describes the primary chemical composition of Vajra (Diamond)?
a. Silicon dioxide (SiO_2)
b. Aluminum oxide (Al_2O_3)
c. Carbon (C)
d. Calcium carbonate ($CaCO_3$)

117. What is the highest hardness rating on the Mohs scale for Vajra (Diamond)?
a. 7
b. 8
c. 9
d. 10

118. Which type of Vajra is considered suitable for pharmaceutical use as per Rasashastra texts?
a. Round-bodied, bluish, with multiple lines
b. Six-angled, clean, and extremely hard
c. Broken with dull radiance
d. Containing crow's claw impressions

119. What is the correct method for the Shodhana (purification) of Vajra?
a. Grinding it with ghee and honey
b. Boiling it in water for seven days
c. Steam processing in Dolayantra using Kulattha Kvatha for three days.
d. Heating it directly on an open flame

120. What is the recommended dose of properly incinerated Vajra Bhasma for therapeutic use?
a. 1-2 grams
b. 1/4 to 1/2 teaspoon
c. 1/32 - 1/16 ratti (3.9 to 7.8 mg)
d. 10-15 mg

121. What is the chemical composition of Kaparda?
a. Calcium Oxide
b. Sodium Chloride
c. Calcium Carbonate
d. Magnesium Sulfate

122. Which of the following is the correct sequence of steps in the Shodhana process of Kaparda using Method 01?
a. Break Kaparda, suspend in Dolayantra, svedana with Kanji, wash, and dry.
b. Wash Kaparda, grind into powder, heat on charcoal, and seal in samputa.
c. Pulverize Kaparda, soak in Kanji, dry, and use directly.
d. Heat Kaparda on charcoal, seal in samputa, and incinerate with cow dung cakes.

123. What is the recommended weight category for the Uttama quality of Kaparda?
a. Half Sana (1.5 g)
b. One Sana (3 g)
c. 1½ Nishka (18 g)
d. Two Nishka (24 g)

124. Which Doshas are pacified by Kaparda according to its properties?
a. Pitta and Kapha
b. Vata and Kapha
c. Pitta and Vata
d. All three Doshas

125. What should be done immediately after preparing Varatika Bhasma to reduce Tikshnatva (sharpness)?
a. Mix it with honey.
b. Heat it again on charcoal.
c. Keep it in water for 24 hours.
d. Add lemon juice to neutralize its properties.

126. Which classical Ayurvedic texts extensively reference the use of Shukti?
a. Charaka Samhita, Sushruta Samhita, Ashtanga Sangraha, Ashtanga Hridaya
b. Kashyapa Samhita, Harita Samhita, Sushruta Samhita
c. Bhela Samhita, Madhava Nidana, Sushruta Samhita
d. Charaka Samhita, Bhavaprakasha, Madhava Nidana

127. What is the primary chemical composition of Shukti?
a. Calcium Phosphate
b. Magnesium Carbonate
c. Calcium Carbonate
d. Sodium Bicarbonate

128. Which process is used for the purification (Shodhana. of Shukti as per Rasatarangini?
a. Heating directly over the flame
b. Immersing in Jayanti Svarasa and steaming in Dolayantra
c. Boiling in milk
d. Washing with lemon juice

129. What is the therapeutic dose of Shukti Bhasma as mentioned in Rasatarangini?
a. 2 grams
b. 2 ratti (250 mg)
c. 500 mg
d. 5 grams

130. Which therapeutic indications are associated with Shukti Bhasma?
a. Mutra Roga, Shvasa, Pliha Roga
b. Jvara, Raktapitta, Chardi
c. Pandu, Kamala, Kushtha
d. Amlapitta, Aruchi, Vataroga

131. What is the scientific name of the Indian conch shell?
a. Turbinella purum
b. Strombus gigas
c. Turbinella pyrum
d. Eustrombus maculatus

132. Which property of conch shells is primarily responsible for their durability?
a. Calcium sulfate
b. Calcium carbonate
c. Magnesium carbonate
d. Sodium chloride

133. According to Ayurvedic texts, what is an ideal characteristic of a Shankha (conch shell)?
a. Irregular surface
b. Round body with a smooth surface
c. Large opening at the base
d. Bright red color

134. What is the purpose of the Svedana (steaming) process in the purification of Shankha?
a. To enhance flavor
b. To remove impurities
c. To increase weight
d. To change color

135. Which of the following is a therapeutic use of Shankha (conch shell)?
a. Enhancing memory
b. Treating ajirna (indigestion)
c. Improving eyesight
d. Reducing inflammation

136. What is the chemical formula for Gypsum?
a. $CaSO_4$ b. $CaSO_4 \cdot 2H_2O$
c. $CaSO_4 \cdot H_2O$ d. $CaSO_4 \cdot 3H_2O$

137. Which of the following properties best describes Godanti?
a. Perfect cleavage and a luster of dull
b. Conchoidal fracture and a specific gravity of 3.0
c. Vitreous luster and a specific gravity of 2.3
d. Opaque appearance and a hardness of 5

138. Which type of Gypsum is characterized by multiple adjacent shiny layers?
a. Selenite b. Alabaster
c. Satinspar d. Godanti

139. What is the main therapeutic effect of Godanti as per Ayurvedic texts?
a. Vata-pittahara b. Dipana
c. Balya d. All of the above

140. What is the recommended dose of Godanti in Ayurvedic medicine?
a. 1 ratti (125 mg)
b. 1-3 ratti (125 mg to 375 mg)
c. 5 ratti (625 mg)
d. 10 ratti (1250 mg)

141. What is the primary chemical composition of Samudraphena (Cuttlefish bone)?
a. Calcium Sulfate
b. Calcium Phosphate
c. Calcium Carbonate
d. Magnesium Carbonate

142. What is the synonym for Samudraphena that indicates its connection to the sea?
a. Dindira b. Phena
c. Abdhikapha d. Saphena

143. Which therapeutic effect of Samudraphena is related to its ability to improve vision?
a. Lekhana b. Chakshushya
c. Pachana d. Visha Dosha

144. What is the recommended dose of Samudraphena in Ayurvedic practice?
a. 1 ratti (125 mg) b. 2 ratti (500 mg)
c. 3 ratti (750 mg) d. 4 ratti (1000 mg)

145. Which of the following properties is attributed to Samudraphena?
a. Ushna (Heating)
b. Kaphahara (Kapha reducing)
c. Ruksha (Drying)
d. Vata increasing

146. What is the primary component of Kukkutanda Tvak that makes it significant in Ayurvedic medicine?
a. Magnesium b. Potassium
c. Calcium d. Sodium

147. What is the synonym for Kukkutanda Tvak mentioned in the text?
a. Kukkutanda b. Dimbha
c. Dakshinanda Tvak d. Hen's shell

148. What is the therapeutic indication for Kukkutanda Tvak related to urinary disorders?
a. Rakta Pradara b. Mastishka Roga
c. Bahumutra d. Prameha

149. What is the recommended dose of Kukkutanda Tvak in Ayurvedic practice?
a. 1 - 2 Ratti (125 mg to 250 mg)
b. 2 - 4 Ratti (250 mg to 500 mg)
c. 3 - 5 Ratti (375 mg to 625 mg)
d. 4 - 6 Ratti (500 mg to 750 mg)

150. Which of the following properties is attributed to Kukkutanda Tvak?
a. Ushna (Heating)
b. Kaphavatahara (Kapha and Vata reducing)
c. Ruksha (Drying)
d. Vata increasing

151. What is the chemical composition of Borax (Tankana)?
a. $NaB_3O_6 \cdot 5H_2O$ b. $Na_2B_4O_7 \cdot 10H_2O$
c. $Na_2CO_3 \cdot 10H_2O$ d. NaCl

152. Which therapeutic condition is Borax (TankanA. commonly used to treat?
a. Fever b. Cough (Kasa)
c. Headache d. Skin rash

153. What is the color of the common variety of Borax (Tankana)?
a. Blue b. Green
c. White d. Yellow

154. Which of the following is a synonym for Tankana mentioned in the text?
a. Sodium chloride b. Muktadi
c. Dimbha d. Svarna

155. What is the primary property of Borax (Tankana. as described in the text?
a. Sweet (Madhura) b. Bitter (Katu)
c. Sour (Amla) d. Salty (Lavana)

Answer Sheet

1.	B.	2.	C.	3.	C.	4.	B.	5.	C.	6.	C.	7.	C.	8.	B.
9.	B.	10.	A.	11.	B.	12.	C.	13.	C.	14.	C.	15.	B.	16.	B.
17.	B.	18.	B.	19.	B.	20.	C.	21.	B.	22.	C.	23.	C.	24.	B.
25.	C.	26.	B.	27.	B.	28.	B.	29.	B.	30.	A.	31.	A.	32.	C.
33.	B.	34.	C.	35.	A.	36.	A.	37.	B.	38.	D.	39.	B.	40.	A.
41.	B.	42.	D.	43.	B.	44.	B.	45.	B.	46.	B.	47.	C.	48.	B.
49.	C.	50.	B.	51.	B.	52.	D.	53.	C.	54.	D.	55.	B.	56.	A.
57.	B.	58.	B.	59.	B.	60.	C.	61.	B.	62.	C.	63.	C.	64.	A.
65.	B.	66.	A.	67.	B.	68	C.	69.	B.	70.	B.	71.	B.	72.	C.
73.	D.	74.	B.	75.	B.	76.	A.	77.	C.	78.	A.	79.	B.	80.	B.
81.	C.	82.	B.	83.	B.	84.	A.	85.	C.	86.	B.	87.	D.	88.	A.
89.	B.	90.	C.	91.	B.	92.	B.	93.	B.	94.	C.	95.	C.	96.	A.
97.	B.	98.	B.	99.	B.	100.	B.	102	C.	103.	B.	104.	B.	105.	C.
106.	B.	107.	C.	108.	B.	109.	B.	110.	A.	111.	B.	112.	C.	113.	B.
114.	C.	115.	C.	116.	C.	117.	D.	118.	B.	119.	C.	120.	C.	121.	C.
122.	A.	123.	C.	124.	B.	125.	C.	126.	A.	127.	C.	128.	B.	129.	B.
130	A.	131.	C.	132.	B.	133.	B.	134.	B.	135.	B.	136.	B.	137.	C.
138.	D.	139.	D.	140.	B.	141.	C.	142.	B.	143.	B.	144.	B.	145.	B.
146.	C.	147.	C.	148.	C.	149.	B.	150.	B.	151.	B.	152.	B.	153.	C.
154.	C.	155.	B.												

Write Short Question

1. What are the commonly used synonyms for Parada and Abhraka in Ayurvedic texts?
2. How is Makshika identified mineralogically, and what are its distinguishing features?
3. What are the primary sources of Shilajatu and Gandhaka mentioned in classical Ayurveda?
4. Enumerate the types of Hingula and Svarna based on Ayurvedic classifications.
5. What are the criteria for selecting Mukta as grahya (acceptable) and identifying agrahya (unacceptable) qualities?
6. Which doshas are associated with Tamra before purification, and what methods are used for its Shodhana?
7. Describe the Marana process for Loha and how it affects its properties.
8. What physico-chemical changes are expected during the Shodhana and Marana of Rajata?
9. Why is temperature critical during the Marana of Vajra, and what are the consequences of temperature variation?
10. Summarize recent research findings on the medicinal uses of Kukkutanda Tvak and Tankana Kshara.

Write Long Question

1. Discuss the synonyms of Parada, Abhraka, and Makshika as mentioned in Ayurvedic texts. Highlight their significance in identifying the drugs and their classical references in Rasashastra.
2. Explain the mineralogical characteristics of Gandhaka, Haratala, and Manahshila. How do their natural forms influence their therapeutic applications in Ayurveda?
3. Elaborate on the natural sources of Shilajatu, Mukta, and Pravala. Discuss the impact of geographical and regional variations on their quality and effectiveness.
4. Provide a detailed account of the types of Hingula, Loha, and Tamra as per Ayurvedic and modern classifications. How do these types differ in terms of therapeutic properties?
5. What are the detailed criteria for selecting Shukti, Kaparda, and Shankh as grahya? Discuss the properties that render them agrahya and unfit for medicinal use.
6. Discuss the detailed Shodhana methods for Vanga, Naga, and Yashada. How do these procedures eliminate doshas and prepare the materials for therapeutic use?
7. Describe the Marana process for Svarna and Rajata. Include details on specific steps, media used for Bhavana, and the significance of these techniques in enhancing bioavailability.
8. Analyze the probable physico-chemical changes observed during the Shodhana and Marana of Mandura and Samudraphena. How do these changes affect their medicinal properties?
9. Discuss the role of controlled temperature in the processing of Vajra and Tankana Kshara. Include potential outcomes of temperature deviations and their impact on the final product.
10. Review recent research on the therapeutic applications of Godanti, Kukkutanda Tvak, and Samudraphena. How do modern findings align with traditional Ayurvedic uses?

• • •

9 Rasa Dravya Parichaya - II

• Lecture: 7 hours, non-lecture: 6 hour • • Total Marks- 5 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Sasyaka (Peacock ore)

Introduction

- Sasyaka is the sixth mineral drug in the Maharasa group.
- Chemically, Sayaka is identified as copper sulfate, also known as cupric sulfate, with the formula $CuSO_4$.
- Common names for copper sulfate include blue vitriol and blue stone.
- In Mythology, Garuda, after consuming the Halahala poison and drinking Amrita (nectar of immortality), vomited the poison mixed with Amrita onto the Marakatachala mountain. This mixture later solidified on the mountain, transforming into what is called Sasyaka.
- The synthetic form of Sasyaka is referred to as Tutha or Mayuratuttha.
- Copper sulfate remains listed as an antidote in the World Health Organization's ATC code under V03.

Synonyms

तुत्थं तु तुत्थकं तुत्थाञ्जनञ्चापि मयूरकम्।
सस्यकं ताम्रगर्भञ्च शिखिग्रीवञ्च तन्मतम्।। (R.T. 21/71)

Tuttham, Tutthakam, Tutthanjana, Mayurakam, Sasyakam, Tamragarbha, Shikhigriva.

Mineralogical Identification

Properties	Identification
Chemical Name	Copper Sulphate
Chemical Composition	$CuSO_4 \cdot 5H_2O$
Colour	Bright and Deep Blue
Cleavage	Poor
Luster	Vitreous
Taste	Metallic
Specific Gravity	2.1-2.3
Hardness	2.52
Fracture	Conchoidal
Tenacity	Brittle

Sources

1. Naturally sourced from oxidized zones of copper sulphide ore deposits.
2. Found with hydrated sulphates of copper and iron.
3. Found in Sweden, Germany, Spain, France, and the UK.
4. Naturally scarce, with occurrences mainly in Bihar, Rajasthan, Madhya Pradesh, and Jharkhand.
5. Artificially manufactured in chemical industries at Surat, Calcutta, Amritsar, Varanasi, and other locations.
6. Predominantly relies on commercially manufactured Tuttha due to limited natural availability.

Ancient Time

पीत्वा हालाहलं वान्तं पीतामृतगरुत्मता।
विषेणामृतयुक्तेन गिरौ मरकताह्वये।
तद्वान्तं हि घनीभूतं सञ्जातं सस्यकं खलु।। (R.R.S. 2/125-126)
मयूरकण्ठसच्छायं भाराढ्यमतिशस्यते।।

According to the legend, after consuming Amrita, Garuda later ingested Visha and subsequently vomited both onto the Nilgiri Mountain, where they solidified over time, giving rise to Sasyaka. Sasyaka is described alongside Mayur Tuttha and Tuttha Kharpara, with the term "Mayurakantha" highlighting its distinct coloration, resembling a peacock's neck with shades of blue, green, and red. This coloration differs from Tuttha ($CuSO_4 \cdot 5H_4O$), which lacks green and red hues. The mineral Bornite (CuFeS), known for its peacock-like iridescence, is likely the Sasyaka described in Ayurvedic texts. Rasajalanidhi also supports this distinction, recognizing Sasyaka as a naturally occurring substance and Tuttha as its artificial counterpart.

Types

सस्यकं हि स्वभावजं तुत्थकं कृत्रिमं मतम्।
एकाभावे परं ग्राह्यं नात्र कार्या विचारणा।। (R.J.Ni., p.110)

1. Svabhavaja Tuttha (Natural)
2. Kritrima Tuttha (Artifical)

Grahya Lakshana

शिखिकण्ठसमच्छायं गुरु स्निग्धं महोज्ज्वलम्।
तुत्थकं शस्यते विज्ञैरन्यद्धीनगुणं मतम्।। (R.T. 21/72)

1. Deep bluish color like peacock's neck
2. Guru (Heavy)
3. Snigdha (unctuous)
4. Shining Surface.

Doshas

वान्ति भ्रान्तिमशुद्धं तत्कुरुते शोधितं शुभम्। (Ay.Pra. 4/39)
The administration of Ashuddha Tuttha can lead to intense vomiting and dizziness.

Shodhana

Method 01:

तुत्थं विचूर्ण्य खल्वे नवनिम्बुकोत्थवारा।
परिपेषयेद् द्वियामं रसतन्त्रकर्मविज्ञः।। (R.T. 21/106)

1. Take the required quantity of Ashuddha Tuttha in a clean Khalva Yantra (mortar and pestle).
2. Add an appropriate quantity of Nimbu Swarasa (lemon juice) to the Tuttha.
3. Triturate the mixture thoroughly for two Yamas (6 hours) to ensure uniform processing.
4. Spread the triturated Tuttha in the same Khalva Yantra and dry it under sunlight.
5. Once completely dried, transfer the purified Tuttha (Shuddha Tuttha) to an airtight container.
6. Use the purified Tuttha for pharmaceutical preparations or therapeutic purposes as needed.

Method 02:

सस्यकं शुद्धिमाप्नोति रक्तवर्गेण भावितम्।
स्नेहवर्गेण संसिक्तं सप्तवारमदूषितम्।। (R.R.S. 2/129)

1. Place Ashuddha Tuttha in a clean Khalva Yantra.
2. Select a Svarasa (juice) or Kvatha (decoction) of Raktavarga Dravyas like Khadira, Manjishtha, Laksha, or Kusumbha.
3. Add the chosen liquid to the Tuttha and triturate thoroughly for seven Bhavanas (cycles).
4. After the final cycle, dry the Tuttha completely.
5. Collect the Shuddha Tuttha and store it in an airtight container for pharmaceutical or therapeutic use.

Marana

Method-01

पलोन्मितं तुत्थकं तु गन्धकन्तु पलार्द्धकम्।
शरावसम्पुटे न्यस्य मृदा च परिलेपयेत्।।
पुटत्रयं प्रदातव्यं स्वल्पैरेव वनोत्पलैः।
तुत्थकं मृतिमाप्नोति वान्तिभ्रान्त्यादिवर्जितम्।।
(R.T. 2/125-126)

1. Weigh 1 Pala (48g) of Shuddha Tuttha and ½ Pala (24g) of Shuddha Gandhaka.
2. Place both in a Sharava Samputa (earthen crucible) and seal it tightly.
3. Subject the sealed crucible to one Laghu Puta using dry cow dung cakes.
4. Allow it to cool naturally, then open the crucible.
5. Add ½ Pala (24g) of fresh Shuddha Gandhaka and reseal the crucible.
6. Perform a second Laghu Puta and repeat the process with another ½ Pala (24g) of Shuddha Gandhaka before the third Laghu Puta.
7. After cooling, collect the Tuttha Bhasma and ensure it is free from impurities.
8. Store the Bhasma in an airtight container for use.

Method-02

लकुचद्रावगन्धाश्मटङ्कणेन समन्वितम्।
निरुध्य मूषिकामध्ये म्रियते कौक्कुटैः पुटैः।। (R.R.S. 2/131)

1. Combine equal parts of Shuddha Tuttha, Shuddha Gandhaka, and Shuddha Tankana in a clean Khalva Yantra and triturate into a uniform mixture.
2. Add Lakucha Svarasa (juice) and triturate further.
3. Shape the mixture into uniform Chakrikas (pellets) and sun-dry until moisture-free.
4. Place the dried pellets in a Musha Samputa and subject them to one Kukkuta Puta.
5. Repeat the process two more times, adding fresh Shuddha Gandhaka and Shuddha Tankana each time.
6. After the third Puta cools, collect the purified Tuttha Bhasma, ensuring it is free from impurities.
7. Store the Bhasma in an airtight container for therapeutic use.

Probable Physico-chemical Changes

- **During the Shodhana process of Tuttha** : (copper sulfate) using Nimbu Svarasa (lemon juice) involves a series of intricate chemical and physical transformations.

1. **Chelation Reaction** : The citric acid in Nimbu Svarasa reacts with copper sulfate, leading to the formation of a copper citrate complex. This chelation reduces the inherent toxicity of raw copper sulfate and enhances its bioavailability, aligning with the Ayurvedic goal of transforming raw materials into safe therapeutic agents.
   $CuSO_4$ + Citric Acid → Copper Citrate
2. **Reduction of Impurities**: The acidic environment facilitated by citric acid aids in the breakdown and removal of impurities such as basic copper carbonate or copper oxides present in raw Tuttha. These may dissolve or undergo chemical transformation, purifying the substance.
3. **Water of Crystallization Removal** : Grinding and sunlight drying during the process result in the loss of water of crystallization from copper sulfate. This dehydration yields anhydrous copper sulfate, which is a more stable and concentrated form.
   $CuSO_4\ 5H_2O \rightarrow CuSO_4$ (anhydrous) + $5H_2O$ (evaporate)
4. **Particle Size Reduction and Homogenization** : Through trituration (grinding), the particle size of Tuttha is reduced. This results in increased surface area, better homogenization, and enhanced therapeutic efficacy.
5. **Formation of Soluble Salts**: Acid-base reactions between Nimbu Svarasa and basic impurities (e.g., copper oxides or carbonates) in raw Tuttha result in soluble salts like copper sulfate, which can be washed away easily, further purifying the material.

- **During Marana Process:**

1. **Dehydration of Tuttha (Copper Sulfate)**: - Initial heating removes water of crystallization.
   $CuSO_4\ 5H_2O \rightarrow CuSO_4$ (anhydrous) + $5H_2O$ (evaporate)
   Outcome: Blue crystalline Tuttha turns into white anhydrous copper sulfate.
2. **Formation of Copper Sulfide**: - Reaction of Tuttha with sulfur (Gandhaka) under heat produces copper sulfide and sulfur dioxide.
   $CuSO_4 + 4S = CuS + 2SO_2$
   Outcome: Darkening of the material due to copper sulfide formation and impurity removal via SO_4 release.
3. **Oxidation of Copper Sulfide**: Controlled heating in oxygen partially converts copper sulfide to copper oxides
   $CuS + O_2 \rightarrow Cu_2O + SO_2$
   Outcome: Stabilization through oxide formation.
4. **Repeated Sulfur Integration**: Subsequent additions of sulfur enhance copper's transformation into bioactive forms.
   Outcome: A homogeneous compound with improved therapeutic properties.
5. **Particle Size Reduction**: Heating and cooling cycles reduce particle size.
   Outcome: Improved bioavailability of Bhasma.
6. **Purification via Gas Release**: Release of sulfur dioxide and water vapor eliminates toxic impurities.
   Outcome: Purified and safe Bhasma.

Importance of Temperature while Processing

1. **Facilitating Thermal Decomposition**: At high temperatures such as 1350°C, Tuttha undergoes thermal decomposition, transforming into stable

oxides or other desired chemical compounds essential for its therapeutic applications.

2. **Driving Redox Reactions**: Elevated temperatures promote oxidation-reduction reactions critical for converting raw Tuttha into bioavailable forms. This process effectively eliminates harmful impurities like arsenic or sulfur compounds.
3. **Toxicity Elimination**: Controlled heating at specific temperatures ensures the safe volatilization or neutralization of toxic elements, making Tuttha suitable for medicinal use.
4. **Enhancing Purity**: Calcination at high temperatures removes volatile impurities, organic residues, and moisture, yielding a purified and stable end product.
5. **Reducing Particle Size**: Sustained exposure to 1350°C aids in sintering, a process that merges particles and reduces their size, thereby improving bioavailability.
6. **Promoting Chemical Uniformity**: Consistent heat distribution fosters uniform chemical reactions, resulting in a homogeneous Bhasma with reliable therapeutic properties.
7. **Preventing Phase Instabilities**: Precise temperature control averts unwanted phase changes or unstable intermediates, ensuring a chemically stable final product.
8. **Modifying Crystalline Structure**: Heating at specific temperatures alters the crystalline structure of minerals, an important factor for achieving desired pharmacological effects in Tuttha Bhasma.
9. **Removing Bound Water and Carbonates**: At 1350°C, chemically bound water, carbonates, and other volatile components in Tuttha are expelled, stabilizing the final product.
10. **Protecting Equipment Integrity**: Well-planned heating protocols minimize thermal stresses, preventing cracks or damage to crucibles, thus maintaining process efficiency.
11. **Improving Therapeutic Efficacy**: Uniform high-temperature calcination produces nano- or micro-sized particles, enhancing the absorption and efficacy of the Bhasma in biological systems.
12. **Ensuring Pharmaceutical Consistency**: Adhering to precise temperatures, such as 1350°C, guarantees that the Bhasma meets stringent standards of purity, stability, and effectiveness required in Ayurvedic and modern medicine.

Dose

गुञ्जाष्टमांशतो गुञ्जपादिकं तुत्थकं मृतम्।
तत्तद्भेषजयोगेन वीतशङ्कः प्रयोजयेत्।। (R.T. 21/130)

Dose: 1/8th Ratti (15mg) – 1/4th Ratti (30 mg)

Anupana

Ghrita, Tambula Patra Svarsa, Madhu.

Yoga

1. Tuttha Drava
2. Jatyadhi Ghrita
3. Lokanatha Rasa
4. Tuttamrita Malahara
5. Suchimukha Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Mineralogical Identification and Characterisation of Sasyaka - An Ayurvedic Drug	Prem Shankar Pandey Department of Rasa Shastra and Bhaishajya Kalpana, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India	The study focuses on the mineralogical characterization of Sasyaka based on Grahya Lakshana from Rasa Shastra and Ayurvedic Pharmacopoeia standards. It compares the physicochemical analysis of Sasyaka, Bornite, and Chalcanthrite, confirming Sasyaka's authenticity as Bornite. Sasyaka is used therapeutically as Bhasma after Shodhana (purification) and may be combined with herbs. Bhasma helps maintain alkalinity, neutralize harmful acids, and its reduced particle size improves absorption and assimilation in the body.
2.	Experimental Study on Extraction of Sasyaka Satwa	Neela C. Sudi, Prof. and HOD Department of Rasashastra, SVM Ayurvedic Medical College, Ilkal, Karnataka – 587125.	This study highlights Satvapatana, which aims to extract therapeutically active material. According to Rasa Ratna Samuchaya, Satvapatana of Sasyaka yielded 10 grams of Tamra Satva, practically proving the accuracy of the Acharyas' teachings.

Sr.No.	Article Name	Author Name	Result
3.	Conceptual Review on Sasyaka (Tuttha)	Dr. Abinash Pradhan, 3rd Year PG Scholar, Department of Rasashastra and Bhaisajya Kalpana, SJG Ayurveda Medical College, Koppal, Karnataka	This study highlights that Sasyaka is natural, while Tuttha is artificial. Sasyaka has a peacock-neck color and is beneficial in Vata-Kaphaja conditions, with properties like Lekhana, Bhedana, and Krimighna. It treats skin diseases, vitiligo, diabetes, heart disease, and obesity, balances Kapha and Pitta doshas, enhances strength, alleviates pain, and serves as a Rasayana when used long-term.

Kasisa (Green Vitriol)

Introduction

- Kasisa is a significant Rasashastra drug classified under the Uparasa group.
- It is a green-colored iron mineral, chemically identified as ferrous sulfate.
- Therapeutically, it is used in managing anemia, promoting hair growth, and treating eye and skin disorders.
- A solid theoretical foundation is essential to achieve practical expertise in its application.

Synonyms

काशीशकञ्च कासीसं पुष्पकासीसकन्तथा।
पांशुकं पांशुकासीसं खगाख्यञ्च प्रकीर्तितम्।। (R.T. 21/227)

Kasisa, Kashishaka, Pushpakasisa, Pamshuka, Pamshukasisa, Khaga.

Mineralogical identification

Properties	Identification
Chemical Name	Ferrous Sulphate
Chemical Composition	$FeSO_4$
Color	Greenish White
Cleavage	Perfect
Luster	Vitreous
Specific Gravity	1.90- 1.97
Hardness	1.94- 2
Fracture	Conchoidal
Tenacity	Brittle
Streak	White

Sources

1. It exists both in its native form and as a synthetic product.
2. Artificial preparation involves the reaction of sulfuric acid with iron.
3. It occurs naturally due to the decomposition of iron pyrites when exposed to atmospheric moisture.
4. Found in regions with iron pyrite deposits.
5. Naturally available in countries like the USA, Germany, Bavaria, Sweden, Spain, and in India across states such as Bihar, Punjab, Odisha, and Uttar Pradesh.

Types

चूर्णकासीसकञ्चैव पुष्पकासीसकन्तथा।
कासीसं द्विविधं ख्यातं रसतन्त्रप्रणेतृभिः।। (R.T. 21/228)

1. Churna Kasisa
2. Pushpa Kasisa

कासीसं बालुकाद्येकं पुष्पपूर्वमथापरम्। (R.R.S. 3/51)

1. Baluka Kasisa
2. Pushpa Kasisa

कासीसं धातुकासीसं पांसुकासीसमित्यपि।
किञ्चित्तदेव पीतं तु पुष्पकासीसमुच्यते।। (Ay.Pra. 2/273)

1. Kasisa
2. Dhatu Kasisa
3. Pushapakasisa

कासीसं त्रिविधं शुक्लं कृष्णं पीतमिति प्रिये।
(Rasarn.V. 7/81)

1. Shukla Kasisa
2. Krishna Kasisa
3. Pitta Kasisa

पीतं कृष्णं सितं रक्तं चतुर्धेति परे जगुः। (An.Kand.)

1. Pitta Kasisa
2. Krishna Kasisa
3. Sita Kasisa
4. Rakta Kasisa

Grahya Lakshana

चूर्णकासीसकं श्वेतमीषत्पीतञ्च कीर्तितम्।
पुष्पकासीसकं स्वच्छहरिद्वर्णं प्रकीर्तितम्।। (R.T. 21/229)

1. Churna Kasisa- Shveta Varna (White)
2. Pushpa Kasisa- Harita Varna (Green) & Svachchha.

Shodhana

Method 01

सकृद्भृङ्गाम्बुना क्लिन्नं कासीसं निर्मलं भवेत्। (R.R.S. 3/55)

1. Take the necessary quantity of ashuddha kasisa.
2. Pour into a vessel holding sufficient quantity of bhringaraja svarasa (juice of Eclipta alba).
3. Mix once so that the kasisa is well soaked.
4. Decant the liquid carefully so that the powder of kasisa is separated from the swarasa.
5. Dry the kasisa powder completely.
6. Store the dried kasisa for future use as shuddha kasisa (pure kasisa).

Method 02

कासीसं भृङ्गराजोत्थवारिणा घटिकात्रयम्।
सकृत् श्विन्नं प्रयत्नेन शुद्धिमायात्यनुत्तमाम्।। (R.T. 21/230)

1. The kasisa granules are to be tied in a cloth into the shape of a pottali or a cloth bundle.
2. Suspend the pottali in a dola-yantra containing bhringaraja svarasa as the liquid medium.
3. Steam the pottali (svedana) for 3 hours to dissolve the kasisa in the liquid.
4. After 3 hours, remove the pottali from the dola-yantra.
5. Allow the liquid to cool naturally.
6. Carefully decant the supernatant liquid.
7. Collect the kasisa sediment from the bottom of the dola-yantra.
8. Dry the sediment of kasisa in the sun.
9. Store the dried Shuddha kasisa in an airtight container for further pharmaceutical use.

Marana

Method- 01:

काञ्जिकेन तु विभाव्य सप्तधा शोषयेत् खगमिनांशुभिर्बुधः।
सम्पुटेच्च लघुना पुटेन तत् स्याद्धि भस्म खलु लोहितप्रभम्।।
समादायाथ तद्भस्म पेषयेन्निम्बुकद्रवैः।
चक्रिकाः कारयित्वा च पुटेल्लघुपुटे पुनः।।
यावन्निरम्लं तद्भस्म तावदेवं पुनः पुनः।
निम्बूकोत्थै रसैर्वैद्यः पिष्ट्वा संशोष्य सम्पुटेत्।।
सुश्लक्ष्णं जायते भस्म सर्वदोषविवर्जितम्।
तत्साध्येषु विकारेषु वीतशङ्कः प्रयोजयेत्।।
(R.T. 21/255-258)

1. Take the required quantity of Shuddha kasisa churna in a clean khalva yantra.
2. Subject the churna to seven bhavanas with kanji (fermented rice water), allowing it to dry completely after each bhavana.
3. After the seventh bhavana, enclose the powder in a Sharava samputa and subject it to one laghu puta (mild heating).
4. Allow it to cool naturally, then triturate the reddish kasisa bhasma with nimbu svarasa (lemon juice).
5. Form small, even-sized pellets (chakrikas) and dry them.
6. Enclose the dried pellets in a Sharava samputa and subject them to another laghu puta.
7. Repeat the trituration, pellet formation, drying, and laghu puta cycle until the kasisa bhasma is free from amlatva (sourness).
8. This process results in soft, fine, and well-incinerated kasisa bhasma suitable for therapeutic use.

Method- 02

स्नुहीपत्ररसैर्यद्वा मर्दितं पुटितं मुहुः।
निरम्लीभावपर्यन्तं कासीसं भस्मतामियात्।। (R.T. 21/259)

1. Take Shuddha kasisa churna in a clean khalva yantra and triturate with snuhi patra svarasa until homogeneous.
2. Form small, evenly sized pellets (chakrikas) and dry them completely.
3. Enclose the dried pellets in a Sharava samputa and subject to one laghu puta (mild heating).
4. Allow cooling, then triturate the bhasma again with snuhi patra svarasa.
5. Reform chakrikas, dry, and enclose in Sharava samputa for another laghu puta.
6. Repeat trituration, pellet formation, drying, and laghu puta until the kasisa bhasma is free from amlatva.
7. This process results in soft, fine, and well-incinerated kasisa bhasma suitable for therapeutic use.

Probable Physico-chemical Changes

During Shodhana Process

a. Method 01:

- **Physical Changes**: Removes impurities, makes texture finer and more uniform, and changes color (darker/greener).
- **Chemical Changes**: Organic acids dissolve non-essentials, neutralize sulfuric acid, and infuse beneficial phytochemicals (flavonoids, tannins, alkaloids).

b. Method 02:

- **Physical Changes**: Improves purity, reduces granule size, and creates a more homogeneous, crystalline appearance.
- **Chemical Changes**: Removes water-soluble impurities and toxins, stabilizes kasisa via chelation with bioactives, and reduces acidity (pH adjustment).

During Marana Process

a. Physical Changes

- **Particle Size Reduction:** Trituration, pellet formation, and heating yield micronized, smooth, non-gritty bhasma.
- **Color Change:** Reddish kasisa turns grayish or reddish-brown, with darker hues in Method 02 due to organic residues from Snuhi patra svarasa.
- **Loss of Sourness:** Neutralization of sourness (amlatva) occurs due to reactions with media like Kanji or Snuhi patra svarasa.
- **Improved Homogeneity and Strength**: Uniform cakrikas with enhanced structural integrity are formed.

b. Chemical Changes

- **Iron Oxidation**: $FeSO_4$ oxidizes to stable ferric oxide (Fe_4O_4) or magnetite (Fe_4O_4) at high temperatures.
- **Neutralization of Acidity**: Kanji or Snuhi patra svarasa neutralizes residual sulfuric acid and removes acidic impurities.
- **Organic Adsorption**: Phytochemicals (e.g., tannins, acids) from the herbal media adsorb onto the surface, enhancing therapeutic properties.
- **Thermal Decomposition**: $FeSO_4$ decomposes into Fe_4O_4, releasing water, SO_3, and SO_4 during heating.
- **Chelation**: Herbal bioactives chelate with iron ions, forming stable, bioavailable iron-organic complexes.
- **Stabilization**: Heating ensures complete conversion to non-toxic, stable iron oxides.
- **Impurity Removal**: Water-soluble and volatile impurities are eliminated through heating and herbal processing.

Importance of Temperature while Processing

- Temperature is crucial in the preparation of Kasisa Bhasma for achieving desired chemical, physical, and therapeutic qualities. During laghu puta or gaja puta, the controlled temperature serves several purposes:
- In laghu puta, mild heating at approximately 200–400°C is applied to gently prepare the material for further processing.

1. **Marana (Incineration)**: Converts Shuddha Kasisa into bioavailable bhasma by breaking down its metallic or mineral structure into a microfine state, with milder heat in laghu puta preventing damage to medicinal properties.
2. **Toxicity Removal**: Heat detoxifies the material by eliminating volatile impurities and neutralizing residual acidity (amlattva) from kasisa or additives like kanji.
3. **Therapeutic Potency**: Balanced heat preserves or enhances medicinal properties. Overheating destroys efficacy, while underheating leaves it incomplete.
4. **Fineness (Su-shlakshnata)**: Proper heating ensures particles reach a microfine size, critical for absorption at the cellular level.
5. **Stability & Shelf Life**: Adequate heat removes moisture, preventing material degradation and increasing shelf life.

Dose

गुञ्जार्द्धतः समारभ्य रक्तिकाद्वितयोन्मिता।
कासीसकस्य कथिता पूर्णमात्रा भिषग्वरैः।। (R.T. 21/242)

½ Ratti – 2 Ratti (62 mg- 250 mg)

Anupana

Honey, Ghrita.

Properties

कासीसद्वयमम्लोष्णं तिक्तं च तुवरं तथा।
वातश्लेष्महरं केश्यं नेत्र्यं कण्डूविषप्रणुत्।।
मूत्रकृच्छ्राश्मरीश्वित्रनाशनं परिकीर्तितम्। (Ay.Pra. 2/275)

- **Rasa**: Amla, Tikta, Kashaya

- **Guna**: Snigdha
- **Virya**: Ushna
- **Vipaka**: Katu
- **Karma**: Balya, Netrya, Kesaranjana, Artavajanana
- **Dosha**: Vata Kapha Hara.
- **Therapeutic indications**: Kandu, Vishahara, Mutrakrichchhra, Ashmari, Shvitra.

Yoga

1. Kasisadhi Taila
2. Kasisadhi Gutika
3. Hinguladhi Taila
4. Kumarika Vati
5. Brihat Chintamani Rasa

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pharmaceutico-therapeutic vistas of Kasisa (green vitriol) in Ayurveda	Rohit Sharma, Dept. of Rasashastra & Bhaishajya Kalpana, Abhilashi Ayurvedic College & Research Institute, Abhilashi University, Mandi, Himachal Pradesh	This review highlights the pharmaceutico-therapeutic potential of Kasisa from an Ayurvedic perspective, though only a few evidence-based studies validate its benefits. Existing literature shows that Shuddha Kasisa and Kasisa Bhasma have significant potential, warranting further scientific exploration. While standardization and safety data are available, clinical and pharmacological studies remain limited, emphasizing the need for future research into Kasisa's unexamined therapeutic applications.
2.	A Review Study of Role of Kasisa In Shwitra	Dr. Samiksha Sundarka, P.G. Scholar Dept. of Rasashastra and Bhaishajya Kalpana, Bhausaheb Mulak Ayurved Mahavidyalaya, Nagpur. M.S.	This study highlights Kasisa, known for its Shwitrahara action, which penetrates the deeper layers of the skin, breaking down Dosha blockages and stimulating melanocytes to restore normal pigmentation. Therefore, formulations containing Kasisa can yield significant results in treating Shwitra (vitiligo).
3.	A Pharmaceutical And Physico-Chemical Analysis of Kasisa Bhasma	Ashish Kumar Jaisawal, Senior Medical Officer, P.G. Department of Rasa-shastra & Bhaishajya Kalpana, Government Ayurveda College, Patna, Bihar.	Kasisa Bhasma was analyzed using Ayurvedic tests like Varnam and Rekhapurnatva, along with modern methods like AAS, XRD, and SEM. Key evaluations included pH, ash values, and disintegration time. The Rasamritam Shodhana and Marana processes were found to be efficient, economical, and time-saving.

Gauri pashana (Arsenic oxide)

Introduction

- Malla is an essential Sadharana Rasa, ranked second in the list of Sadharana Rasas.
- Most Rasashastra texts classify Malla under the Sadharana Rasa category.
- The use of Malla as a medicinal substance dates back to the Samhita period.
- Acharya Sushruta categorized Malla as Dhatuvisha (metallic poison) and referred to it as Phenashma.
- Malla, along with Haratala, is recognized as a Dhatuvisha in classical Ayurvedic literature.

Synonyms

शङ्खमूषं शङ्खविषं गौरीपाषाणकं तथा।
दारुमूषं दारुमूषा दारुमोचश्च मल्लकः।।
फेनाश्मभस्मसंज्ञश्च सोमलः सम्बलं तथा।
आखुपाषाणकं चैव रसज्ञैः परिकीर्तितम्।।

(R.T. 11/130-131)

Shankhamusha, Shankhavisha, Gouripashnaka, Darumusha, Darumocha, Mallaka, Phenashma bhasma, Somala, Sambala and Aakhupashana.

Mineralogical identification

Properties	Identification
Chemical Name	Arsenic Trioxide
Chemical Composition	As_2O_3
Colour	White or tin white
Cleavage	Distinct
Luster	Submetallic
Streak	White
Specific Gravity	5.6 – 5.8
Hardness	3-4
Fracture	uneven
Transparency	Opaque

Sources

1. Its appearances in nature are limited, mostly seen with iron, copper, and sulfur ore.
2. Its mineral presence is significant in China, Europe, and other parts of the world.
3. It is found in India in Hazaaribagh (Jharkhand), Chitral (Kashmir) with Makshika ores.
4. It is produced artificially in industrial chimneys or at the place of burning minerals (arsenopyrites) containing arsenic.

Types

गौरीपाषाणकः पीतो विकटो हतचूर्णकः।
स्फटिकाभश्च शङ्खाभो हरिद्राभस्त्रयः स्मृताः।।
पूर्वः पूर्वो गुणैः श्रेष्ठः। (R.R.S. 3/124)

1. Sphatikabha– Shveta Varna
2. Shankhabha– Pandu Varna
3. Haridrabha– Pita Varna

मल्लस्तु द्विविधः प्रोक्तः श्वेतोऽन्यो रक्तकस्तथा।
कृत्रिमः श्वेतमल्लस्तु रक्तश्चाकरसम्भवः।। (R.T. 11/132)

1. Shveta Gauripashana – Kritrima (Artifical)
2. Rakta Gauripashana– Naisargika (Natural)

Shodhana

Method 01:

गौरीपाषाणकं श्रेष्ठं कारवल्लीफले क्षिपेत्।
स्वेदयेद्भण्डिकामध्ये शुद्धो भवति मूषकः।। (R.R.S. 3/125)

1. Select 4–5 large bitter gourds, make a single incision, and remove seeds.
2. Pound 10 g of unpurified Gauripashana, stuff it into the gourds, and secure the incision with thread.
3. Tie the gourds in a cloth (pottali) and suspend in a dolayantra with fresh bitter gourd juice (karavelli swarasa) as the medium.
4. Heat for 3 hours over a mild flame, ensuring continuous immersion.
5. Extract the Gauripashana, wash with warm water, and dry in shade or low heat.
6. Keep the purified Shuddha Gauripashana in a clean, dry container.

Method 02:

विपाचितं शङ्खविषं यत्नतष्टङ्कणाम्भसा।
गव्यदुग्धेन वा यामं शुद्धिमायात्यनुत्तमाम्।। (R.T. 11/137)

1. Pound Ashuddha gauripashana into smaller pieces.
2. Tie the pieces in a clean cloth to make a pottali (bundle).
3. Suspend the pottali in a dolayantra using tankana jala (alkaline water) or godugdha (cow's milk).
4. Heat gently for one yama (approx. 3 hours).
5. Remove, untie, and wash the contents with warm water.
6. Dry under shade or mild sunlight and store in an airtight container labeled Shuddha gouripashana.

Marana

पलद्वयं सुराक्षारमम्बरीषे न्यसेद्भिषक्।
स्तूपाकारतया तत्र चूर्णितं हस्तिदन्तकम्।।
निदध्यादथ चुल्ल्याञ्च वह्निमारोप्य दीपयेत्।
यदैकीभूय निर्धूमं भवेद्भस्मनिभं तथा।।
तदावतार्य तद्भस्म कूप्यां सम्प्रेष्य स्थापयेत्।
भस्मादस्मात्तु कर्षैकं मूषायां सन्निधाय च।।
तोलकप्रमितं शुद्धं मल्लखण्डं ततो न्यसेत्।
ऊर्ध्वं दद्यात्पुनर्भस्म कर्षैकप्रमितञ्च तत्।।
शरावेण निरुध्याथ लावकाख्ये पुटे पुटेत्।
सुशुभ्रं भस्म मल्लस्य तस्मादपनयेद् बुधः।।
एवं तु नियतं भस्म मल्लसयस परिजायते।
गुणामात्रानिश्चयश्च ज्ञेयः शोधितमल्लवत्।।

(R.T. 11/171-76)

1. Place 96 g Sura Kshara and 96 g Hastidanta Churna in a mud pot, shaping into a conical mound.
2. Heat the pot gently over mild fire until moisture evaporates, leaving a fine, dry residue (bhasma). Cool and collect.
3. In a crucible, layer 24 g prepared powder, 12 g Shuddha Gauripashana, and another 24 g powder.
4. Seal in a Sharava Samputa and heat per Lavaka Puka protocol.
5. Cool naturally, then collect the white Malla Bhasma.

Probable Physico-chemical Changes

During Shodhana

a. Physical Changes

- **Reduction in Hardness**: Heat and liquid immersion soften Gaurapasana, making it more friable.
- **Color Change**: The bright yellow or orange-red hue becomes dull or pale due to impurity

removal and reactions with the medium (e.g., Karavelli Svarasa, alkaline water, or milk).

- **Size and Texture**: Heating and liquid interaction yield smaller particle sizes and smoother surfaces.
- **Improved Homogeneity**: Uniform impurity extraction creates a purified, consistent material.

b. Chemical Changes

- **Detoxification**: Partial detoxification reduces the toxicity of arsenic trisulfide (As_2S_3) via oxidation and complex formation with herbal acids, proteins, or alkalines.
- **Impurity Removal**: Soluble impurities like arsenic oxides are dissolved and eliminated.
- **Chelation**:
  - **Method 01**: Organic acids in Karavelli Svarasa stabilize arsenic through chelation.
  - **Method 02**: Proteins in milk or hydroxides in Tankana Jala bind arsenic, reducing reactivity.
- **Alkaline Reaction**: Tankana Jala hydrolyzes impurities, neutralizing acidity.
- **Neutralization**: Herbal juices or milk reduce surface toxicity.
- **Thermal Transformation**: Mild heating converts trace arsenic compounds to inert forms, like arsenic trioxide (As_2O_3).
- **Therapeutic Retention**: The sulfur content (As_2S_3) is preserved, maintaining medicinal value.

During Marana Process

a. Physical Changes

- **Particle Size Reduction**: Grinding and heating produce micro or nanoparticle-sized bhasma, improving bioavailability.
- **Color Change**: The material transitions from yellowish-red to white or ash-like, indicating stabilization into oxides or sulfides.
- **Texture Alteration**: Crystalline structures become soft, fine, and homogeneous.
- **Weight Reduction**: Loss of volatile impurities and water reduces mass.

b. Chemical Changes

- **Detoxification**: Toxic arsenic trisulfide (As_2S_3) transforms into inert forms like arsenic trioxide (As_4O_4) or stable sulfides/oxy-sulfides.
- **Oxidation**: High heat oxidizes arsenic sulfides to oxides or mixed sulfides/oxides.
- **Neutralization**: Alkaline Sura Kshara and organic Hastidanta Churna neutralize acidic residues, reducing toxicity.
- **Sulfur Stabilization**: Sulfur interacts with calcium (from Hastidanta Churna) or potassium (from Sura Kshara) to form stable sulfides, enhancing safety and therapeutic efficacy.
- **Formation of Arsenic-Calcium Complexes**: Calcium reacts with arsenic, forming less toxic complexes like calcium arsenates.
- **Impurity Removal**: Volatile impurities (e.g., SO_2 and residual arsenic oxide) are eliminated during incineration.

Importance of temperature while Processing

Temperature is critical in the preparation of Malla Bhasma to ensure ingredient transformation and therapeutic efficacy. Key roles under the Lavaka Puta protocol include:

1. **Moisture Removal and Initial Transformation**
   - **Stage**: Gentle heating of Sura Kshara and Hastidanta Churna in a mud pot.
   - **Role**: Removes moisture without decomposition and ensures uniform mixing.
2. **Complete Calcination (Bhasmikarana)**
   - **Stage**: Heating at 450–600°C under Lavaka Puta.
   - **Role**: Breaks down materials into a stable, microfine bhasma and enables ingredient interaction for transformation.
3. **Avoiding Overheating or Undercooking**
   - **Significance**: Prevents decomposition of active components (overheating) and incomplete calcination with toxic residues (undercooking).
4. **Detoxification**
   - **Role**: Adequate heat removes volatile impurities, detoxifying Sura Kshara and Gauripashana.
5. **Desired Bhasma Characteristics**
   - **Stage**: Post-heating collection of Malla Bhasma.
   - **Role**: Produces impurity-free, fine-textured bhasma meeting traditional Siddhi Lakshana standards like Rekhapurnata and Varitara.

6. Preserving Therapeutic Potency

- **Objective**: Retain and enhance medicinal properties.
- **Role**: Converts inorganic elements into bioavailable forms while maintaining efficacy.

Dose

खनेत्रेन्दुमिताद् भागाद् रक्तेरारभ्य यत्नतः।
खवह्निभागप्रमितं शङ्खमूषं नियोजयेत्।। (R.T. 11/145)
1/120th Ratti – 1/30th Ratti (1 mg-4 mgs)

Anupana

Honey, Ghrita, Navnita, Sugar

Properties

गौरीपाषाणकः शुद्धो मात्रया परिशीलितः।
कफवातामयहरो बल्यो वृष्यो रसायनः।।

श्वासं शीतज्वरं पाण्डुं प्लीहवृद्धिं फिरङ्गकम्।
श्लीपदं सन्धिवातं च तथा कुष्ठानि नाशयेत्।। (R.Mri., 4/2-3)

Rasa: Tikta

Dosha: Kapha- Vatahara

Karma: Balya, Vrishya, Rasayana.

Therapeutic Indications

Shvasa, Shitajvara, Pandu, Plihavriddhi, Phiranga, Shlipada, Sandhivata, Kushtha.

Yoga

1. Suchika Bharana Rasa
2. Malla Sindura
3. Samirapanga Rasa
4. Chandeshvara Rasa
5. Malla Vati

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Evaluation of the Shodhana (Processing) Effect on Gauripashana (Arsenic Trioxide) by Physicochemical Characterization	Abhisheka Nadig, JSS Academy of Higher Education and Research, Mysore, Karnataka.	This study evaluated and compared the physicochemical properties of Shodita (processed) and Ashodita (unprocessed) Gouripashana. Using methods like XRD, DLS, FTIR, SEM-EDX, TEM, AFM, and Raman Spectroscopy, it was found that Shodhana reduced crystallite and particle size, increased organic peaks, and decreased arsenic content. The increase in organic nature and stability of the processed material improves bioavailability and may reduce toxicity.

Trinakanta (Amber)

Introduction

- Trikantamani (Amber) forms from the fossilized resin of ancient pine trees over millions of years.
- It consists of a complex mixture of organic compounds, with no fixed chemical formula.
- Often contains trapped inclusions like insects or plant material preserved within its structure.
- It is among the lightest gemstones, unable to float in freshwater but capable of floating in saltwater.
- Amber is notable for its ability to combust when exposed to flame.

Synonyms

Trikanta, Trikantamani, Trinagrahi

Mineralogical Identification

Properties	Identification
Chemical Name	Succinic Acid
Chemical Composition	$C_{10}H_{12}O$

Properties	Identification
Colour	Blue, Red, Green, Yellow, Orange and Brown
Cleavage	None
Luster	Resinous
Transparency	Opaque
Specific Gravity	1.539-1.545
Hardness	2-2.5
Fracture	Conchoidal
Streak	White

Sources

- Amber is mainly found near the Baltic Sea, especially in Russia which has the largest amount of reserves.
- They are also found in significant deposits in Latvia, Lithuania, north Poland and northern and western parts of Germany.

Other regions with significant amber:

- India
- Italy
- Myanmar
- Mexico

- Canada
- Spain
- Romania
- United States

Besides, these places have been famous for their unique amber specimens with prehistoric inclusions (insect and plants) that contributed some more information about the ancient ecosystems.

Shodhana

Washed in hot water then dried.

Marana

सूक्ष्मं खण्डीकृतो वैद्यः स्थपुटेशुभे।
विपाके गजपुटेयत्नेमृणकान्त भस्मं लभेत्।। (Rasen.Sam.)

1. Divide Trinakata Mani (Amber) into suitable uniform sizes.
2. Place the pieces into clay cupels.
3. Close the joints of the cupels with clay or another appropriate sealing material.
4. Put the sealed cupels to a staged heating process using the Gajaputa method.
5. Ensure the heating is gradual for consistent transformation.
6. Allow the heated cupels to cool completely.
7. Open the cupels and gently remove the samyak stage of Bhasma.
8. Ensure the Bhasma is finely powdered and uniform in color before packing or use.

Pishti

1. Shuddha Trinakanta is finely powdered.
2. The powder is triturated with Gulab Arka or Chandana Arka for 2-3 days to achieve a fine consistency.
3. The resulting Trinakanta Pishti is dried to remove moisture.
4. Stored in an airtight container to maintain quality and efficacy.

Dose

- **Pishti**: 1 Masha-2 Masha (1-2 gms)

Anupana

Madhu, Navanita, Sharkara.

Properties

- **Guna**: Ruksha, Shita, Shlakshana
- **Virya**: Shita
- **Dosha**: Pittahara
- **Karma**: Hridaya, Indriya Prasadana, Grahi, Rakta Stambhana.
- **Therapeutic Indication**: Raktapitta, Hridroga, Pittavikara.

Probable Physico-chemical Changes

a. Physical Changes

- **Particle Size Reduction**: Amber is broken into smaller pieces, ground into finer particles during heating (mardana), increasing surface area and bioavailability.
- **Color Change**: Amber transitions from yellow/brown to darker shades, reflecting decomposition and formation of new substances. Final Bhasma exhibits uniform color.
- **Loss of Original Form**: The structure breaks down, becoming brittle and losing resinous qualities.
- **Texture Changes**: A solid chunk transforms into a fine, homogeneous powder.
- **Weight Loss**: Volatile components like water and oils are expelled, reducing mass.

b. Chemical Changes

- **Organic Decomposition**: Heat breaks down amber's hydrocarbons into smaller volatile molecules, leaving mineralized residue.
- **Oxidation**: Trace metals oxidize (e.g., iron to iron oxide), enhancing stability.
- **Volatile Evaporation**: Oils and resins vaporize, purifying the material.
- **Formation of Inert Compounds**: Harmful impurities are transformed into stable, inert substances.
- **Reduction**: Carbon in the environment reduces metal oxides to base forms.
- **Sintering**: Particles fuse during heating, creating uniform consistency.
- **Final Transformation**: A fine, stable ash (Bhasma) is formed, ensuring bioavailability and purity.

Importance of Temperature while Processing

The Gajaputa method, performed at temperatures of 800–1000°C, is essential for preparing Trinakata Mani Bhasma (Amber):

- **Uniform Calcination**: Gradual heating ensures consistent transformation, avoiding cracks or incomplete calcination.
- **Impurity Removal**: High heat removes organic impurities and detoxifies the material.
- **Siddhi Lakshanas**: Ensures the bhasma meets Ayurvedic standards like Varitara and Rekhapurnata.
- **Preservation of Medicinal Properties**: Controlled heat retains therapeutic efficacy and converts Amber into a bioavailable form.
- **Prevention of Overheating**: Avoids degradation or fusion, ensuring the product's stability and safety.

Temperature control in the Gajaputa process guarantees the safety, effectiveness, and high quality of Trinakata Mani Bhasma.

Yoga

1. Javaharmohara
2. Brahmi Vati

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Characterization and antimicrobial study of Trinakantamani (Amber) Pishti	Namrata Joshi Department of Rasa Shastra, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India	The EDEX study results showed that Pishti samples had a smaller particle size (701 nm) compared to the raw form (1-2 µm), which may enhance the drug's absorption in the body. All heavy metals in the samples were within permissible limits, and the primary elements—carbon, hydrogen, and oxygen—confirmed its similarity to Amber.
2.	Pharmaceutical Standardization and Preliminary Assessment of Trinakantamani Pishti	Bhavin M.Chavda, Upgraded department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College, Vadodara, Gujarat, India	This paper emphasizes that pharmaceutical standardization is the first essential step in the standardization of any medicinal drug or product. Each of the three batches required eight hours of trituration with various liquid media. An average weight gain of 16.21% was observed for Trinakantamani Pishti, as shown in Table No. 4. No significant changes were noted in the physicochemical parameters.
3.	Pharmaceutical Standardization and Preliminary Physico-Chemical Evaluation of Trinakantamani Bhasma	Bhavin M.Chavda, Upgraded department of Rasashastra and Bhaishajya Kalpana, Government Ayurveda College, Vadodara, Gujarat, India	Trinakantamani Bhasma was prepared according to Bheshaja Samhita, Bhasma-Pishti Prakarana for Vataja, Pittaja, and Kaphaja Galagraha, Gala Granthi, and Gandamala. Ten pilot batches were created to determine optimal heat, with three batches processed at 230°C. The average volumes of liquid media used for Bhavana were 130, 143, and 128 ml, yielding 0.77%. Peak temperature was reached in 20 minutes, and self-cooling took 14 hours. The color changed from light yellow to brownish yellow, with no significant changes in physicochemical parameters.

Akika (Agate)

Introduction

1. Akika is categorized under Sikata Varga and Uparatna Varga, denoting its status as a semi-precious gemstone in Ayurvedic texts.
2. The Siddhabheshaja Manimala includes Akika in the Paradaadi Varga, indicating its role in formulations related to mercury and Rasa Shastra.
3. Texts like Rasadarpana and Rasamritam classify Akika under Uparatna Varga, further emphasizing its importance in the semi-precious stone category.
4. According to the Ratna Pradipa, Akika is classified under Sphatika Varga Ratna, highlighting its crystalline nature and gem-like characteristics.
5. The inclusion of Akika in these Vargas reflects its multifaceted uses in Ayurvedic medicine, particularly for its therapeutic applications and significance in Rasa Shastra.

Synonyms

Rudhira, Hridaya, Hakika, Paandha, Pashanahridaya, Raktapashana, Raktabham, Shona, Hridayopalam, Putika, Paalyashma.

Mineralogical identification

Properties	Identification
Chemical Name	Silicate
Chemical Composition	SiO_2
Colour	White, blue, red, green, yellow, orange, brown, pink, purple, grey, black.
Cleavage	Not Present
Luster	Waxy
Streak	White

Properties	Identification
Specific Gravity	2.5 – 2.65
Hardness	6 - 7
Fracture	Conchoidal
Tenacity	Brittle

Sources

- Akika, typically found in its purest form, often fills voids in Deccan Trap formations.
- Found in igneous and metamorphic rocks worldwide.
- Major global sources include the U.S. (Oregon, Washington, Idaho, Montana), Germany, Russia, Egypt, and Australia.
- **Indian Locations**:
  - **Gujarat**: Rajpipla, and areas near the Tapti-Narmada confluence.
  - **Maharashtra**: Amaravati, Aurangabad, Buldhana, Chandrapur, Jalna, Nasik, Pune.
  - **Andhra Pradesh**: Krishna and Godavari riverbeds.
  - **Other States**: Rajmahal, Sahebganj (Bihar), Dhar, Mandsaur (Madhya Pradesh), Jaipur, Jamnagar, Kutch, Surat (Gujarat).

Types

- According to Ayurveda Sara Sangraha: -
  1. Shveta
  2. Pita
  3. Nila
  4. Rakta
- According to Rasa Darpana: -
  1. Shveta
  2. Pita
  3. Nila
  4. Rakta

Grahya Lakshana

According to Rasamrita-

1. Katina (Heavy)
2. Rakta (Red Color)
3. Yakrita varnaya yukta (Liver Colored)

Doshas

Vrikka & Kanta Vikara

Shodhana

1. **According to API**:
   - 21 times nirvapana karma with gulabajala, dugdha, vedamushka arka.
2. **According to Rasa Darpana**:
   - Svedana for 3 Hours with Amla Vargiya Dravya Rasa.

Marana

a. Method- 01

1. Purify the Akika (Shodhita) using standard Ayurvedic methods.
2. Grind the purified Akika into a fine powder using suitable techniques.
3. Combine the powdered Akika with Kumari Svarasa (Aloe vera juice) or Gulabarka (rose water).
4. Triturate thoroughly until a uniform paste is formed.
5. Shape the paste into small, uniform flat discs (chakrikas).
6. Dry the chakrikas completely in a shaded area or under controlled conditions to prevent moisture retention.
7. Place the dried chakrikas into a Sharava Samputa (earthen saucer) and seal it securely to protect the contents during heating.
8. Subject the sealed Sharava Samputa to 3 Gajaputas (high-temperature heating cycles) as per the prescribed method.
9. Allow the Sharava Samputa to cool naturally after each Gajaputa.
10. Open the cooled Sharava Samputa and collect the prepared Akika Bhasma.
11. Test for Siddhi Lakshanas (confirmatory characteristics) to ensure proper preparation.

b. Method- 02

1. Purify the Akika as per standard Ayurvedic methods to ensure it is free from impurities.
2. Grind the purified Akika into a fine, smooth, and uniform powder (Shuddha Akika Churna).
3. Triturate the Akika Churna sequentially with the following liquids until a homogeneous mixture is formed:
   - Kumari Svarasa (Aloe vera juice)
   - Ketaki Rasa (Pandanus flower extract)
   - Jalapippali Svarasa (Water pepper extract)
   - Rambha Svarasa (Banana plant juice)
4. Shape the triturated mixture into small, uniform, flat discs (chakrikas).
5. Dry the chakrikas thoroughly in a shaded area or under controlled conditions to prevent moisture retention.
6. Place the dried chakrikas in a Sharava Samputa (earthen saucer) and seal it tightly.
7. Subject the Sharava Samputa to 7 consecutive Kukkuta Putas (moderate-temperature heating cycles), allowing adequate cooling between each cycle.
8. After the heating cycles, let the Sharava Samputa cool completely.
9. Open it and collect the prepared Akika Bhasma.
10. Verify the Siddhi Lakshanas (confirmatory characteristics) to ensure the bhasma meets Ayurvedic quality standards.

Pishti

1. Cleanse and purify the Akika according to standard Ayurvedic guidelines to prepare it for further processing.
2. Grind the purified Akika into a fine powder with a smooth and uniform consistency.
3. Triturate the powdered Akika using one of the following liquids:
   - Gulab Arka (rose water)
   - Ketaki Arka (essence of Pandanus flower)
   - Chandana Arka (essence of sandalwood)
4. Continue the trituration process 21 times or for 3 consecutive days, ensuring a finely blended and smooth consistency.
5. After thorough trituration, ensure the Akika transforms into a fine, soft powdered form, ready for therapeutic use.
6. Store the prepared Akika Pishti in an airtight container to protect its potency and prevent contamination.

Dose

2 - 4 Ratti (250 – 500 mg)

Anupana

Go Dugdha, Navanita, Amalaki Svarasa, Adraka Svarasa and Kushmanda Svarasa.

Properties

Rasa: Kashaya & Madhura
Guna: Shita
Virya: Shita
Vipaka: Madhura
Dosha: Pitta Shamaka
Karma: Hridaya, Vrishya, Rakta Janaka, Netrya, Balya, Medhya, Ojo- Vardhaka.
Therapeutic Indications: Rakta pitta, Hridaya, Ashmari, Prameha, Daha, Unmada, Kasa, Vrana, Visha, Anidra, Raktarsha, Netra Vikara.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- **Softening and Moisturizing**: The substance becomes softer and more porous.
- **Size and Mass Reduction**: Impurities dissolve, reducing overall size and weight.
- **Volatile Component Evaporation**: Pores open, aiding in the expulsion of volatile compounds during steaming.

b. Chemical Changes

- **Impurity Neutralization**: Toxic metals, salts, and organic compounds are solubilized and neutralized.
- **Acid-Base Reactions**: Interaction with acidic substances (e.g., Amla) breaks down metals and minerals.
- **Chelation and Detoxification**: Harmful compounds are detoxified and rendered inert.
- **Volatile Component Removal**: Toxic volatiles are released and vaporized.

During Marana Process

a. Physical Changes

- **Purification**: Removal of impurities by soaking, boiling, or other methods, softening the material.
- **Grinding**: Reduction of particle size to increase surface area and porosity for better reactivity.
- **Shaping**: Formation of a uniform paste (Kalpa) into discs (chakrikas).

- **Drying**: Removal of excess moisture to prepare the material for heating.
- **Heating**: Expansion and contraction of material due to thermal cycles, leading to a color change, typically to a fine ash-like form.

b. Chemical Changes

- **Detoxification**: Neutralization of toxic components through purification.
- **Chelation**: Interaction with liquids like Kumari Svarasa or herbal extracts, forming complexes that help in the removal of impurities.
- **Oxidation/Reduction**: High temperatures cause oxidation or reduction reactions, converting toxic metals into stable, non-toxic compounds.
- **Decomposition**: Breakdown of organic contaminants into non-toxic residues during heating.
- The final product, Bhasma, is a fine, homogeneous, and non-toxic ash, meeting Ayurvedic therapeutic standards.

Importance of Temperature while Processing

- Temperature is critical during Marana to ensure the proper transformation of Akika into bioavailable, safe, and therapeutically effective bhasma.
- **High Temperature (Gajaputa - Method 01):** Facilitates complete structural breakdown of Akika, achieving Siddhi Lakshanas like varitaratva (lightness) and rekhapurnatva (fineness).
- **Moderate Temperature (Kukkuta Puta - Method 02):** Ensures gradual, uniform calcination, preserving the properties of bhavana dravyas and preventing over-processing.
- Sequential heating cycles detoxify the material, maintain uniformity, and refine the bhasma to meet Ayurvedic quality standards. Proper temperature control is vital to ensure safety, efficacy, and therapeutic potency.

Yoga

1. Akika Bhasma
2. Akika Pishti

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	A Conceptual Review on Rasadravya Akika (Agate) – An Ayurvedic Perspective	Jyotiba P Patil, Final Year P.G. Scholar, Department of Rasa shastra and Bhaishajya Kalpana, Shri Shivayogeeshwar Rural Ayurvedic Medical College and Hospital, Inchal, Karnataka.	This article reviews the origin, purification, Marana, and Pishtikarana of Akika from Ayurvedic literature. Akika is used to treat various conditions, including heart diseases (hridya rogas), Vata-Pitta disorders, insanity (unmade), excessive bleeding (raktapradara), and urinary issues (urakshata).
2.	A Critical Review on Akika: An Uparatna	Vidyashree, PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Taranath Govt. Ayurvedic Medical College, Ballari, Karnataka, India	Akika possesses Kashaya and Madhura rasas, Sheeta veerya, and Madhura vipaka, along with properties such as Pittashamaka, Rakta-sthambaka, Hridaya, Netrya, and Hridaya prabhava, as mentioned in Ayurvedic literature. Based on these attributes, many pharmaceutical companies are extensively producing Akika Pishti and Bhasma to benefit humanity.
3.	Pharmaceutical Standardization of Rakta Akika Bhasma and Pishti	Nirali shah	This research standardizes Rakta Akika Bhasma and Pishti. Three batches of Bhasma were prepared by purifying and calcining Akika, while three batches of Pishti were made through levigation, based on Rasa Tantra Sara and Siddha Prayoga Sangrah. The Bhasma used 10 Shera (9.321 kg) of cow dung cakes, yielding 80.44%, and the Pishti yielded 102.44%, with colors of light brown and grayish pink. This study confirms the standardization of both formulations according to classical methods.

Sudha (Lime stone)

Introduction

- **Quick Lime / Lime (Calcium Oxide)**: Also known as CaO, quick lime is a white, crystalline, odorless solid with strong alkalinity.
- Produced by heating calcium carbonate $CaCO_3$ to release carbon dioxide.
- Reacts with water to form hydrated lime (slaked lime) and reabsorbs CO_2 to reform calcium carbonate.
- High melting point: 2572°C.

- **Calcium Carbonate (Precipitated Chalk)**:- A fine, white, odorless powder prepared by reacting calcium chloride with sodium carbonate.
- Stable in air, insoluble in water and alcohol, but reacts with dilute acids releasing CO_2.
- Available in heavy and light forms for various uses.
- **Applications:**
  - **Quick lime**: Used in construction, chemical processes, and purification.
  - **Calcium carbonate**: Used in pharmaceuticals, cosmetics, and as an industrial filler due to its stability and versatility.

Synonyms

चूर्णं चूर्णकचूर्णन्तु सुधा सौधविलेपनम्।
तदैव च समाख्यातं शिलाक्षारं भिषग्वरैः।। (R.T.11/215)

Churna, Churnaka, Sudha, Saudhavilepana, Shila Kshara.

Mineralogical Identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	White
Cleavage	Non- Existent
Streak	White
Specific Gravity	2.3 – 2.7
Hardness	3 - 4
Fracture	Splintery
Transparency	Opaque

Sources

- Limestone constitutes 10% of Earth's sedimentary rocks and dominates karst landscapes like crystal cave systems.
- Forms in calm, warm, shallow marine waters, common in coastal and marine regions.
- Widely used historically for construction, raw materials, and chemical processes.
- Found in the Florida Keys (USA) and Niagara Falls region.
- **Limestone Production in India**: Rajasthan is the largest producer, followed by Madhya Pradesh, Andhra Pradesh, Chhattisgarh, Karnataka, Gujarat, Tamil Nadu, and Telangana.

Types

According to particle size

1. Lump Line
2. Pebble Lime
3. Granular Lime
4. Crushed Lime
5. Ground Lime
6. Pulverizer Lime

Shodhana

Not Mentioned

Marana

Not Mentioned

Dose

1. Drop- 60 Drops (1 Year)
2. Tola (for adults)

Anupana

Jala, Go- Dugdha.

Therapeutic Indication

Atisara, Amlapitta, Grahani Roga, Khalika.

Yoga

1. Churnodaka

Preparation of Churnodaka:

रक्तिद्वयोन्मितं चूर्णं पञ्चतोलकसम्मिते।
जले विनिक्षिपेत्प्राज्ञस्त्रियामं स्थापयेद् बुद्धः।।
ततः सारकपत्रेण सारयेत्काचपात्रके।
चूर्णोदककमितिख्यातं तथैव च सुधोदकम्।।
चूर्णोदकं दृढहरित्काचकुप्यां निधापयेत्।
तथातिसंयतेनेह पिधानेन निरोधयेत्।।
चूर्णोदकं कृमिहरमतीसारहरं परम्।
अम्लपित्तप्रशमनं विशेषाद्दुग्धपाचनम्।।
शूलं ग्रहणिकां हन्ति खटीवद् गुणकारकम्।
द्रावकाशनसम्भूतां निहन्ति च विषक्रियाम्।।
आरभ्य त्रिंशद्बिन्दुभ्यः षष्टिबिन्दुमितं परम्।
चूर्णोदकं प्रयुञ्जीत वार्षिकैकस्तनन्धये।। (R.T. 11/216-21)

1. Take 2 Ratti (250 mg) of Sudha (limestone) and grind it into a fine powder.
2. Add 5 Tola (60 ml) of water to the powdered Sudha and mix thoroughly to achieve uniform dispersion.
3. Let the mixture sit undisturbed for 12 hours to allow sedimentation.
4. Gently collect the clear supernatant liquid without disturbing the sediment.
5. Pass the supernatant through a filter paper to remove any fine particles or impurities.

6. Store the filtered liquid in a tightly sealed glass bottle for preservation.
7. The prepared Churnodaka is now ready for therapeutic use as per Ayurvedic practices.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	A short note on Sudha: A mineral source	Ramya M Pavate PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India	A thorough search of classical texts, related articles, and digital media was conducted to gather information on Sudha and its preparation. Sudha, a mineral source of calcium, is an oxide of calcium with a 1:1 ratio of calcium to oxide (quicklime - CaO). It is produced by heating limestone ($CaCO_3$) at high temperatures. Synonyms for Sudha include churna, churnaka, Sudha churna, saudhalepana, saudhavilepa, and shilakshara. It can be used directly or as churnodaka (lime water) for shodhanadi (purification) processes and in various pharmaceutical preparations.
2.	Utility of Sudha Churna in Ayurveda: A Critical Review	Anand Rajaram Mirajakar, PG Scholar, Department of Rasa Shatra and Bhaishajya Kalpana, Government Ayurveda Medical College Bangalore, Bangalore, Karnataka, India.	This study highlights that Sudha Dravya contains calcium compounds, particularly calcium oxide and carbonate, which are effective as antacids for peptic ulcers. Calcium is crucial for physiological functions like blood clotting and muscle contraction. However, excessive calcium intake may lead to peptic ulcers instead of healing.

Khatika

Introduction

- Khatika, or Chalk, is a cheap and easily erasable material used for writing and many other purposes.
- It usually bears a white colour and is a soft solid.
- Found in both natural and man-made forms.
- Mainly composed of calcium carbonate.
- Derived from:
  - Shells of small, usually marine organisms called foraminifera.
  - Calcareous remains of marine algae known as coccoliths.

Synonyms

खटिका खटिनी चैव खटी लेखनमृत्तिका।
कठिनी वै कठिनीका वर्णिका वर्णलेखिका।। (R.T. 11/208)

Khatika, Khatini, Khati, Lekhana Mritika, Kathini, Varnika, Varna Lekhika.

Mineralogical identification

Properties	Identification
Chemical Name	Calcium Carbonate
Chemical Composition	$CaCO_3$
Colour	Light Grey
Cleavage	Non- Existent
Luster	Dull
Streak	White
Specific Gravity	2.3-2.5
Hardness	1
Transparency	Opaque

Sources

1. Natural chalk forms in deep-marine conditions from the accumulation of small calcite plates from plankton.
2. The deposited materials undergo diagenesis, a process in which these deposits compact into rock over time.
3. The chalk deposits are well-known in North American Austin Chalk, Selma Group, and Niobrara Formations.
4. Other significant deposits are found in western Egypt and Western Australia, and in the Champagne area of France the caverns in the chalk are used for wine storage.
5. The famous chalk cliffs are found in Jasmund National Park, Germany, and Mons Klint in Denmark.

Types

खटिका द्विविधा ख्याता खटि गौरखटी तथा।
खटी तु मलिना चान्या श्वेता मृदुशिलोपमा।। (R.T. 11/209)

Two Types

1. **Khati**: Malina (Like Muddy colour)
2. **Goura Khati**: Shveta Varna (White Colour), Soft and clean.

Shodhana

a. Method- 01

खटीचूर्णं शुद्धपात्रे निधाया विमले जले।
प्रक्षालयेद्विधानज्ञो विशुद्ध्यति न संशयः।। (R.T. 11/210)

1. Place Khatika Churna in a clean earthen vessel.
2. Add water and stir to dissolve thoroughly.
3. Filter the solution to remove impurities.
4. Let water settle and collect the wet sediment.
5. Dry the sediment under sunlight until moisture-free.
6. Grind the dried Khatika into a fine powder.
7. Store the powder in an airtight container.

Marana

Not Mentioned

Dose

½ Masha- 1 Masha (½ - 1 gm)

Anupana

Jala

Properties

खटिका शिशिरा तिक्ता मधुरा शोथनाशिनी।
पित्तप्रशमनी कामं विविधव्रणरोपणी।।
कफदाहास्रदोषघ्नी नेत्रामयनिषूदिनी।
हरिद्रर्णातिसारघ्नी स्वेदादिस्त्रावहारीणी।। (R.T. 11/211-212)

- **Rasa:** Madhura & Tikta
- **Guna:** Shita
- **Virya:** Shita
- **Dosha:** Kapha-pittahara
- **Karma:** Vishaghana, Netrya, Shothaghana, Vranaropana.
- **Therapeutic Indications:** Daha, Raktapitta, Shotha, Atisara, Pravahika, Grahani, Netra Roga.

Probable Physico-Chemical Changes

a. Physical Changes

- **Dissolution:** Khatika dissolves in water, breaking into smaller particles.
- **Filtration:** Impurities are removed by separating larger particles.
- **Sedimentation:** Purified material settles at the bottom after filtering.
- **Drying:** Moisture evaporates under sunlight, forming a solid.
- **Grinding:** The dried material is ground into a fine powder to enhance reactivity.

b. Chemical Changes

- **Purification:** Water-soluble impurities are removed during dissolution and filtration.
- **Absorption:** Remaining impurities are absorbed or eliminated during sedimentation.
- **Stabilization:** Drying and grinding reduce moisture, stabilizing the material.

Yoga

1. Mugdha Rasa
2. Khatikadi peya
3. Khatikadhi Churna
4. Dashana Samskara Churna

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	A Conceptual Review on Khatika	Dr. Soumya T. G.	Khatika is a mineral substance used in Rasashastra and falls under the Sudha Varga category. Detailed descriptions can be found in Rasatarangini and Ayurveda Prakasha, while Bhavaprakasha classifies Khatika under Uparasa Varga. This drug is easily accessible, inexpensive, and possesses high therapeutic value, indicated for conditions like Kasa, Haridravarnatisara, Atisweda, Netraroga, Shotha, Vrana, Pravahika, and Grahani. Khatika is comparable to chalk ($CaCO_3$) and is an excellent source of calcium carbonate.
2.	Identification of Mineral Khatika (Chalk) with the Aid of Geological Principles	Dr. Surekha Patil	The current study focuses on khatika samples collected from various regions of India, which were identified based on geological parameters such as color, luster, and streak. The results were then compared with the standard mineral parameters of chalk, confirming the identification and authenticity of the mineral khatika.

Ajashthi

Introduction

- Aja Asthi (Goat Bone) is categorized under Jangama Dravya (animal-origin substances) in Ayurveda.
- Aja Asthi is rich in minerals, primarily containing: Calcium and Phosphorus 18.59%
- Aja Asthi is used in various Ayurvedic formulations for its calcium-rich properties and its role in strengthening and supporting bone health.

Shodhana

Not Mention in Classics.

If needed- Svedana karma for 3 Hrs in any amla drava dravya by using Dola Yantra.

Marana

Not Mention in Classics.

If needed- Media- Kumari Svarasa. Puta- Gajaputa. Final Product- White Colour Bhasma.

Dose

2 -4 Ratti (250 mgs- 500 mgs)

Anupana

Navanita, Sita, Ghrita.

Properties

Rasa: Madhura
Guna: Sukshma
Virya: Ushna
Vipaka: Madhura

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Role of Tikta Ksheer Basti and Ajasthi Bhasma in the Management of Asthi Kshaya Janya Katigat-Vata W.S r^ to Degenerative Lumbar Spondylosis-A Case Study	Sonal D Wankhede, BAMS, MD (Swasthvritta and Yoga), DNYS Assistant Professor, Dept.Of Swasthvritta and Yoga, Skrpach-Nagpur, M.S. India.	The combination of Ajasthi Bhasma, Tikta Ksheer Basti, and local Kati Basti proved to be an effective therapy for treating degenerative lumbar spondylosis. The treatment successfully addressed issues related to asthi kshaya (bone depletion) and vata dosha imbalances. The patient showed significant improvement in pain relief, joint mobility, and reduction in vertigo, demonstrating the effectiveness of this integrated Ayurvedic approach in managing degenerative spinal conditions.
2.	Pharmaceutical, Analytical and Comparative Study of Kukkutanda Twak Bhasma and Ajasthi Bhasma	Krishna Ayyappa K.S.G.B. Assistant Professor, Rasashastra-Bhaishajya Kalpna Department, Sri Adi Shiva Sadguru Allisaheb Shivaryula Ayurvedic Medical College, Guntakal, Anantapuram Dist, Pin: 515803	Both KTB and AJB are valuable Sudhavarga dravyas with significant mineral content beneficial for treating conditions related to bone health and mineral deficiencies. However, AJB demonstrates superior bioavailability compared to KTB, indicating its faster absorption and efficacy in the body.

Jaharmohara (Serpentine)

Introduction

- Jaharmohara/Nagapashana is a compound consisting of Magnesium silicate.
- It is chemically classified as Magnesium iron silicate hydroxide, also known as Serpentine.
- In the Unani system of medicine, this substance is referred to as Jaharmohara.
- Jaharmohara is extensively used in emergency conditions and for various therapeutic purposes.
- It is recognized for its broad therapeutic utility in treating a variety of diseases in traditional medicine.

Synonyms

Nagapashana, Nagashma

Mineralogical Identification

Properties	Identification
Chemical Name	Magnesium Silicate
Chemical Composition	$(Mg,Fe)_3Si_2O_5(OH)_4$
Colour	Olive Green, Yellow, White, Brown, Black
Cleavage	Perfect
Luster	Waxy
Streak	White
Specific Gravity	2.2 – 2.6
Hardness	3 - 6
Fracture	Flexible
Transparency	Opaque

Sources

- Serpentine is a key rock-forming mineral commonly found in various metamorphic and weathered igneous rocks.
- It is distributed in several regions, including China, Tibet, Ladakh, Garhwal, and the Nepalese mountains.
- Serpentine is an important constituent in these geological formations, contributing to the unique mineral composition of these areas.

Shodhana

1. Start with Ashudha Nagapashana (impure Jaharmohra).
2. Heat the Nagapashana until it becomes red hot (reaches a high temperature).
3. Once red hot, quench the Nagapashana into either Godugdha (cow's milk) or Amalaki Svarasa (juice of Indian gooseberry). This helps in purifying the substance.
4. Repeat the heating and quenching process for a total of twenty-one times.
5. After completing the twenty-one cycles, the final product will be Shuddha Nagapashana (purified Nagapashana).

Marana

1. Take Shuddha Nagapashana (a mineral) and finely powder it.
2. Triturate the powdered Nagapashana with milk to enhance its potency.
3. Prepare Chakrikas (small circular pellets) from the triturated mixture.
4. Place the prepared chakrikas in a Sharava Samputa (sealed earthen container).
5. Subject the Sharava Samputa to one Gajaputa (a specific heat treatment).
6. After the Gajaputa process, the resultant material will be Nagapashana Bhasma.

Pishti

1. Begin with the required quantity of Nagapashana (a mineral).
2. Add sufficient Rose water to the Nagapashana.
3. Triturate the mixture thoroughly for 3 to 4 days until a fine powder is formed.
4. This process is known as Nagapashana Pishti, which is a finely powdered preparation used in various Ayurvedic formulations.

Dose

2- 8 Ratti (250 mgs-1 gm)

Anupana

Milk, Gulab jala.

Probable Physico-chemical Changes

a. During Shodhana Process

- **Physical Changes**: Heating causes expansion, softening, and structural changes; quenching induces contraction, removing impurities.
- **Chemical Changes**: Detoxification through quenching in cow's milk or juice neutralizes toxins and leaches impurities. Repetition enhances purification.

b. During Marana Process

- **Physical Changes**: Powdering increases surface area; heating in earthen containers turns the material into a fine ash (Bhasma).
- **Chemical Changes**: High-temperature reactions (oxidation/reduction) stabilize and convert toxins into safe, bioavailable compounds.

c. During Pishti Process

- **Physical Changes**: Trituration with rose water produces a homogeneous, smooth powder.
- **Chemical Changes**: Hydration and interaction with rose water stabilize and activate the material, enhancing medicinal properties.

Importance of Temperature while Processing

Temperature is critical in the Marana process for transforming Nagapashana into a safe, effective bhasma–

- **Structural Transformation**: High heat in Gajaputa breaks the mineral's crystalline structure for better absorption.
- **Detoxification**: Neutralizes toxic elements for safety.
- **Potency Enhancement**: Controlled heating integrates bhavana dravyas, boosting efficacy.
- **Quality Markers**: Ensures varitaratva (floats on water) and rekhapurnatva (fineness).
- **Uniform Calcination**: Guarantees consistent processing of all material.

In short, precise temperature regulation ensures detoxification, uniformity, enhanced potency, and quality of Nagapashana Bhasma.

Yoga

1. Jaharmohara Pishti
2. Bala Vati
3. Muktadi Vati
4. Godanti Mishrana.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Literature Review on Jaharmohra	Dr Vishal S Chaudhari, PG Scholar, Department of Rasashastra & Bhaishajya Kalpana	The aim of the present study was to compile existing research on jaharmohra and provide a brief overview of the various studies conducted on this substance. Jaharmohra is known to be beneficial for conditions such as menorrhagia, high blood pressure, digestive issues, as an antidote, heartburn, and gastroenteritis. Additionally, jaharmohra is an affordable and readily available drug. To facilitate the effective use of this valuable remedy, it is essential to compile all relevant information for a comprehensive study and advancement of Ayurveda.
2.	Standard Operating Procedure of Jahar Mohra Pishti: A Potent Cardio Tonic	Peeyush Kaushik, M.D.Scholar, Department of Rasa Shastra & Bhaishajya Kalpana, Rishikul Campus, Haridwar, Uttarakhand uttcrakhad Ayurved University, Haridwar, Uttarakhand India.	The study concludes that the basic criteria for raw material procurement include SEM, EDX, and X-ray Diffraction analysis. XRD results indicated that Sample 1 and Sample 3 of Jahar Mohra were primarily Antigorite, while Sample 2 was Chrysotile Serpentine. Purification with lukewarm water resulted in a mean loss of 2.48%, and hammering caused an average loss of 1.45%. The distilled rose water, prepared from Rosa damascena, had a pH of 6.4 and contained 0.3% volatile oil. The Pishti Kalpana procedure was used to obtain nano-sized powder of Jahar Mohra.

Dugdhapashana (Talc)

Introduction

1. Dugdhapashana, commonly known as Talc, is a mineral composed of hydrated magnesium silicate [$Mg_3Si_4O_{10}(OH)_2$].
2. Renowned as the softest mineral on earth, it is identified by its smooth, soapy texture, pearly luster, and white to pearly black streak.
3. Talc is highly valued for its softness, lubricating properties, inertness, and ability to absorb oil and moisture.
4. Classified into grades A to D based on whiteness.
5. Dugdhapashana finds applications in pharmaceuticals, cosmetics, paper, textiles, and as a filler or fire retardant in industrial uses.

Synonyms

दुग्धपाषाणको दुग्धी दुग्धपाषाणिका तथा।
दुग्धा दुग्धशिला चैव क्षीरी क्षीरक्षवश्च सः।।
वज्राभो दीप्तिकश्चापि सौधो गोमेदसन्निभः।
दुग्धोपलो दुग्धदृषद् धिषणिः परिकीर्तितः।।

(R.T. 11/230-231)

Dugdhapashana, Dugdhi, Dugdhapashanika, Dugdha, Dugdha Shilla, Kshiri, Kshirakshava, Vajrabha, Diptika, Saudha, Gomedhasannibha, Dugdhautpala, Dugdhadrushadh.

Mineralogical Identification

Properties	Identification
Chemical Name	Magnesium Silicate
Chemical Composition	$Mg_3Si_4O_{10}(OH)_2$
Colour	White, Grey, Brown , Green
Cleavage	Perfect Basal
Luster	Peraly
Specific Gravity	2.58-2.83
Hardness	1
Fracture	Fibrous
Tenacity	Sectile

Sources

1. Talc is a commonly found mineral across the globe, typically in regions where low-grade metamorphism takes place.
2. Notable sources of high-quality crystals or pure talc are located in Austria, Switzerland, Italy, France, Germany, Norway, Siberia, Russia, and the USA.
3. In India, significant reserves of talc are found in states such as Rajasthan, Uttarakhand,

Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Odisha, Sikkim, and Tamil Nadu.

Shodhana

Not Mentioned in Classics.

Marana

Not Mentioned in Classics.

Note: The fine powder of Dugdhapashana is triturated with rose water before use.

Dose

1 - 2 Ratti (125 – 250 mgs)

Anupana

Dadhi, Madhu, Dugdha.

Properties

- **Rasa**: Madhura
- **Guna**: Snigdha, Shita
- **Virya**: Shita
- **Dosha**: Pittahara
- **Karma**: Jwara, Ruchya, Vranaropaka, Shonithasthapana.
- **Therapeutic Indications**: Jvara, Udara Roga, Danta Roga, Twaka Roga, Shvasa, Kasa, Hridroga, Admana.

Research Updates

Not found

Multiple Choice Questions

1. **What is the chemical formula of Sasyaka (Peacock ore)?**
   a. $CuSO_4$ b. $CuSO_4.5H_2O$
   c. $CuFeS_2$ d. Cu_2O
2. **Which of the following is a synonym for Sasyaka?**
   a. Mayurakam b. Shikhigriva
   c. Tamragarbha d. All of the above
3. **Where is Sasyaka commonly found naturally?**
   a. Sweden b. Germany
   c. Rajasthan d. All of the above
4. **Which mythological figure is associated with the origin of Sasyaka?**
   a. Vishnu b. Garuda
   c. Shiva d. Indra
5. **Which substance is used for the purification (Shodhana) of Sasyaka?**
   a. Nimbu Svarasa (lemon juice) b. Milk
   c. Ghee d. Honey
6. **What is the primary chemical composition of Sasyaka?**
   a. Copper oxide b. Copper sulfate
   c. Copper sulfide d. Copper chloride
7. **What process is used to purify Sasyaka in the Ayurvedic tradition?**
   a. Distillation b. Trituration
   c. Calcination d. Fermentation
8. **Which of the following is a property of Sasyaka?**
   a. Light and brittle
   b. Heavy and unctuous
   c. Hard and crystalline
   d. Transparent and soft
9. **What is the therapeutic effect of Shuddha Sasyaka (purified Peacock ore) in Ayurveda?**
   a. Increases appetite
   b. Acts as a detoxifying agent
   c. Improves skin health
   d. Improves memory
10. **What color is characteristic of Sasyaka (Peacock ore)?**
    a. Red b. Yellow
    c. Blue and green with red hues d. White
11. **What is the chemical composition of Kasisa (Green Vitriol)?**
    a. Fe_2O_3 b. $FeSO_4$
    c. Fe_3O_4 d. NaCl
12. **Which of the following is NOT a synonym for Kasisa?**
    a. Kashishaka b. Pushpakasisa
    c. Pitta Kasisa d. Khaga
13. **What is the color of Churana Kasisa?**
    a. Green
    b. White
    c. Yellow
    d. White with a slight yellow
14. **Which of the following is used for the Shodhana (purification) of Kasisa?**
    a. Amla
    b. Bhringaraja Svarasa
    c. Milk d. Ghee

15. What is the primary therapeutic use of Kasisa?
    a. Skin rejuvenation
    b. Promoting hair growth
    c. Managing anaemia
    d. All of the above
16. What is the process used for the preparation of Kasisa Bhasma?
    a. Bhavanas with Kanji followed by heating
    b. Heating in fire alone
    c. Trituration with honey and ghee
    d. Direct use without processing
17. Which of the following is a known effect of Kasisa?
    a. It increases Kapha
    b. It is a potent neurotoxin
    c. It helps in treating urinary disorders (Mutrakrichchhra)
    d. It promotes digestion
18. Kasisa is best described as which type of substance?
    a. A green-colored iron mineral
    b. A type of sugar compound
    c. A rare herbal extract
    d. An alkaline salt
19. What is the Virya (potency) of Kasisa?
    a. Ushna (Hot) b. Shita (Cold)
    c. Madhura (Sweet) d. Tikta (Bitter)
20. Which of the following is a therapeutic indication for Kasisa?
    a. Constipation b. Hair loss
    c. Ashmari (Kidney stones)
    d. Cold and cough
21. What is the chemical name of Gauri Pashana?
    a. Arsenic Trioxide
    b. Sodium Bicarbonate
    c. Calcium Carbonate
    d. Potassium Chloride
22. Which text refers to Gauri Pashana as "Phenashma"?
    a. Charaka Samhita b. Sushruta Samhita
    c. Ashtanga Hridayam d. Rasatarangini
23. What is the primary source of Gauri Pashana?
    a. Iron ore b. Copper ore
    c. Sulfur ore d. Arsenopyrite
24. Which method is used for the purification (Shodhana) of Gauri Pashana?
    a. Heating in a crucible
    b. Immersion in bitter gourd juice
    c. Grinding with milk
    d. Boiling in cow's urine
25. Which of the following is a synonym of Gauri Pashana?
    a. Somala b. Vata
    c. Bhringaraja d. Brahmi
26. What is the chemical formula for Gauri Pashana (Arsenic Trioxide)?
    a. As_4O_3 b. As_2O_3
    c. As_3O_2 d. AsO_4
27. Which substance is used to neutralize Gauri Pashana during the Marana process?
    a. Cow's milk
    b. Sura Kshara and Hastidanta Churna
    c. Tankana Jala
    d. Haritaki powder
28. Which of the following therapeutic conditions can Gauri Pashana help treat?
    a. Skin rashes b. Asthma (Shvasa)
    c. Fever (Shita Jvara) d. All of the above
29. What is the recommended dose of Gauri Pashana?
    a. 1 mg
    b. 1/120th Ratti – 1/30th Ratti (1 mg – 4 mg)
    c. 5 mg
    d. 1 gm
30. Which color is commonly associated with Gauri Pashana?
    a. Green b. Yellow or Orange-red
    c. Black d. White

Here are 10 multiple-choice questions (MCQs) with answers based on the provided information about Trinakanta (Amber):

31. What is the primary chemical composition of Trinakanta (Amber)?
    a. $C_{10}H_{12}O$ b. $C_6H_{12}O_6$
    c. NaCl d. $CaCO_3$
32. What is the typical color of Trinakanta (Amber)?
    a. Blue
    b. Yellow, Orange, Green, Red, and Brown
    c. Black d. Purple
33. Where is the largest amount of Amber (Trinakanta. reserves found?
    a. United States b. Russia
    c. India d. Myanmar

34. What is the hardness of Trinakanta (Amber)?
    a. 3-4 b. 2-2.5
    c. 5-6 d. 1-1.5
35. Which of the following is a key therapeutic indication for Trinakanta (Amber)?
    a. Respiratory disorders
    b. Digestive issues
    c. Raktapitta (bleeding disorders)
    d. Bone fractures
36. What is the dosage of Trinakanta Pishti recommended in Ayurveda?
    a. 5-10 grams b. 1-2 grams
    c. 10-20 grams d. 0.5-1 gram
37. Which method is used for the Marana (processing) of Trinakanta (Amber)
    a. Bhavana b. Gajaputa
    c. Mardana d. Putapaka
38. What is the primary property (Guna) of Trinakanta (Amber)?
    a. Snigdha (Oily) b. Ruksha (Dry)
    c. Ushna (Hot) d. Shita (Cold)
39. Which of the following is NOT a source of Trinakanta (Amber)?
    a. Baltic Sea b. Russia
    c. Myanmar d. South Africa
40. Which of the following is the recommended Anupana (vehicle) for Trinakanta Pishti?
    a. Water b. Milk
    c. Madhu (Honey) d. Ghee
41. Which of the following categories does Akika belong to in Ayurvedic texts?
    a. Uparatna Varga b. Rasapadartha Varga
    c. Navarasa Varga d. Dhanvantari Varga
42. Akika is primarily composed of which chemical substance?
    a. SiO_2 b. NaCl
    c. $CaCO_3$ d. H_2O
43. Which color is not typically associated with Akika?
    a. Blue b. Green
    c. Red d. White
    e. Black f. Violet
44. Which of the following Ayurvedic texts categorizes Akika under Paradaadi Varga?
    a. Rasadarpana
    b. Siddhabheshaja Manimala
    c. Rasamritam
    d. Charaka Samhita
45. Which of the following methods is used for purifying Akika in Ayurveda?
    a. 21 times nirvapana karma with gulabajala
    b. Boiling in water
    c. 7 Gajaputas with herbal extracts
    d. Dry roasting
46. What is the typical hardness range of Akika?
    a. 1-2 b. 3-4
    c. 5-6 d. 6-7
47. What is the primary therapeutic action of Akika in Ayurveda?
    a. Balya (Promotes strength)
    b. Medhya (Enhances intellect)
    c. Pitta Shamana (Balances Pitta)
    d. Hridaya (Supports heart health)
48. What is the method used to prepare Akika Bhasma according to Method 1?
    a. Heating with Amla
    b. 3 Gajaputas in Sharava Samputa
    c. Repeated grinding with honey
    d. Roasting with sesame oil
49. Which of the following is a synonym for Akika?
    a. Hridaya b. Amrita
    c. Pippali d. Bhringaraja
50. Akika is primarily beneficial for which dosha-related imbalance in the body?
    a. Vata b. Kapha
    c. Pitta d. Sadhaka
51. What is the chemical composition of Sudha (Limestone)?
    a. $CaSO_4$ b. $CaCO_3$
    c. NaCl d. $MgCO_3$
52. What is the primary use of Quick Lime (Calcium Oxide)?
    a. Cosmetic products
    b. Water purification
    c. Construction and chemical processes
    d. Food preservation
53. Which of the following is a synonym for Sudha in Ayurvedic texts?
    a. Churnodaka b. Shilakshara
    c. Go-Dugdha d. Rasna

54. **Where is the largest production of limestone found in India?**
a. Gujarat b. Rajasthan
c. Karnataka d. Tamil Nadu

55. **Which of the following is the correct identification of Sudha (Limestone) based on its properties?**
a. Hardness: 5-6
b. Specific Gravity: 2.3–2.7
c. Transparency: Transparent
d. Cleavage: Present

56. **What is the therapeutic indication for using Sudha (Limestone) in Ayurveda?**
a. Fever b. Atisara (diarrhea)
c. Joint pain d. Respiratory diseases

57. **What is the first step in the preparation of Churnodaka with Sudha?**
a. Let the mixture sit for 12 hour
b. Grind 2 Ratti of Sudha into a fine powder
c. Add 5 Tola of Go-Dugdha
d. Filter the supernatant liquid

58. **What should be used as the liquid medium in the preparation of Churnodaka?**
a. Water b. Go-Dugdha (cow milk)
c. Honey d. Ghee

59. **What type of fracture does Sudha (Limestone) exhibit?**
a. Conchoidal b. Splintery
c. Blocky d. Fibrous

60. **According to Ayurvedic texts, what should be used as an Anupana (vehicle) with Sudha?**
a. Ghee b. Water
c. Honey d. Milk

61. **What is the main chemical composition of Khatika (Chalk)?**
a. Calcium Sulfate b. Calcium Carbonate
c. Magnesium Carbonate
d. Sodium Bicarbonate

62. **Which of the following is a synonym for Khatika in Ayurvedic texts?**
a. Shilapadma b. Khatini
c. Lekhana Mritika d. Pippali

63. **What is the colour of Goura Khati, a type of Khatika?**
a. Grey b. White
c. Yellow d. Red

64. **Which region is known for significant chalk deposits used in various applications?**
a. Western Australia b. China
c. Alaska d. Eastern India

65. **What is the primary therapeutic action of Khatika according to Ayurvedic texts?**
a. Antibacterial b. Pain relief
c. Vision support d. Shothaghana (Reduces swelling)

66. **Which of the following is a known therapeutic indication for Khatika?**
a. Indigestion b. Aatisara (Diarrhea)
c. Asthma d. Hair loss

67. **What is the primary method used for the purification (Shodhana) of Khatika in Ayurveda?**
a. Heating in a furnace
b. Dissolving in water, filtering, and drying
c. Grinding with herbal pastes
d. Distillation

68. **What is the Rasa (taste) of Khatika according to Ayurvedic texts?**
a. Bitter and Sweet b. Sour and Astringent
c. Madhura and Tikta (Sweet and Bitter) d. Salty and Sour

69. **What is the dose of Khatika for an adult according to Ayurvedic recommendations?**
a. ½ - 1 Ratti b. ½ - 1 Tola
c. ½ - 1 Masha (½ - 1 gm) d. 1 - 2 gm

70. **Which of the following conditions does Khatika help to treat?**
a. Fever and Infection b. Eye disorders
c. Kidney stones d. Skin diseases

71. **What is the primary mineral content of Ajashthi (Goat Bone)?**
a. Iron and Zinc
b. Calcium and Phosphorus
c. Magnesium and Potassium
d. Sodium and Chloride

72. **In Ayurveda, Ajashthi is categorized as which type of substance?**
a. Udhaka Dravya b. Jangama Dravya
c. Vastu Dravya d. Dravya Ratna

73. **What is the primary therapeutic use of Ajashthi in Ayurvedic formulations?**
a. Skin rejuvenation
b. Strengthening and supporting bone health
c. Enhancing digestion
d. Improving liver function

74. **What is the recommended dose of Ajashthi for therapeutic use?**
a. 1-2 Ratti b. 2-4 Ratti
c. 5-10 Ratti d. 1-2 gm

75. **Which of the following is used as an Anupana (vehicle) for Ajashthi?**
a. Madhu (Honey) b. Navnita (Clarified butter)
c. Jala (Water) d. Gravy

76. **What is the Rasa (taste) of Ajashthi according to Ayurvedic texts?**
a. Tikta (Bitter) b. Madhura (Sweet)
c. Amla (Sour) d. Katu (Pungent)

77. **What is the Guna (quality) of Ajashthi as per Ayurveda?**
a. Heavy b. Light
c. Sukshma (Subtle) d. Snigdh (Oily)

78. **What is the Virya (potency) of Ajashthi?**
a. Ushna (Hot) b. Shita (Cold)
c. Tikshna (Sharp) d. Manda (Mild)

79. **What is the Vipaka (post-digestive effect) of Ajashthi?**
a. Katu b. Tikta
c. Madhura d. Amla

80. **What is the final product after the Marana (calcination) of Ajashthi?**
a. Black Bhasma b. Red Bhasma
c. White Bhasma d. Yellow Bhasma

81. **What is the chemical composition of Jaharmohara (Nagapashana)?**
a. $(Mg,Fe)_3Si_2O_5(OH)_4$ b. $(Ca,Fe)_3Si_2O_5(OH)_4$
c. $(Al,Fe)_3Si_2O_5(OH)_4$ d. $(Na,K)_3Si_2O_5(OH)_4$

82. **Which of the following is a synonym of Jaharmohara?**
a. Nagashma b. Rajavarta
c. Amla Ashma d. Rajavisha

83. **What is the hardness of Jaharmohara (Serpentine)?**
a. 1 - 2 b. 2 - 3
c. 3 - 6 d. 5 - 7

84. **In which of the following regions is Serpentine (Jaharmohara) commonly found?**
a. Himalayas
b. China, Tibet, Ladakh, Garhwal, Nepalese mountains
c. Amazon rainforest
d. Rocky Mountains

85. **What is the primary method used to purify Jaharmohara in Ayurveda?**
a. Heating and quenching
b. Grinding with water
c. Boiling in milk d. Sun-drying

86. **How many times is the heating and quenching process repeated during the Shodhana of Jaharmohara?**
a. 10 times b. 15 times
c. 21 times d. 30 times

87. **What is the final product obtained after the Marana (calcination) of Shuddha Nagapashana?**
a. Jaharamohara Bhasma
b. Jaharmohara Pishti
c. Nagapashana Oil
d. Nagapashana Powder

88. **Which Anupana (vehicle) is commonly used with Jaharmohara?**
a. Rose water b. Milk
c. Water d. Ghee

89. **What is the significance of using Rose water during the Pishti process of Jaharmohara?**
a. It helps in heating the material
b. It enhances the medicinal properties by stabilizing the material
c. It helps in the purification of the material
d. It enhances the taste

90. **What is the temperature significance during the processing of Jaharmohara?**
a. High temperature causes physical expansion only
b. Temperature helps to remove toxins and convert material into bioavailable compounds
c. Temperature is irrelevant in the processing of Jaharamohara
d. Low temperature is used for all processing steps

91. **What is the chemical composition of Dugdhapashana (Talc)?**
a. $Mg_3Si_4O_{10}(OH)_2$ b. $CaCO_3$
c. Al_2O_3 d. NaCl

92. **Which of the following is a synonym of Dugdhapashana?**
   a. Gomedhasannibha b. Amalaki
   c. Haridra d. Shuddha Bhallataka

93. **What is the primary application of Dugdhapashana (Talc) in industry?**
   a. As a filler or fire retardant
   b. As a flavoring agent
   c. As a colorant in paints
   d. As a solvent

94. **Which of the following is the correct dose range for Dugdhapashana (Talc)?**
   a. 5 - 10 Ratti b. 1 - 2 Ratti
   c. 10 - 20 Ratti d. 3 - 5 Ratti

95. **Which of the following is a therapeutic indication for Dugdhapashana?**
   a. Skin diseases (Tvaka Roga)
   b. Diabetes
   c. High blood pressure
   d. Kidney stones

Answer Sheet

1.	B.	2.	D.	3.	D.	4.	B.	5.	A.	6.	B.	7.	B.	8.	B.
9.	B.	10.	C.	11.	B.	12.	C.	13.	B.	14.	B.	15.	D.	16.	A.
17.	C.	18.	A.	19.	A.	20.	C.	21.	A.	22.	B.	23.	D.	24.	B.
25.	A.	26.	B.	27.	B.	28.	D.	29.	B.	30.	B.	31.	A.	32.	B.
33.	B.	34.	B.	35.	C.	36.	B.	37.	B.	38.	B.	39.	D.	40.	C.
41.	A.	42.	A.	43.	F.	44.	B.	45.	A.	46.	D.	47.	D.	48.	B.
49.	A.	50.	C.	51.	B.	52.	C.	53.	B.	54.	B.	55.	B.	56.	B.
57.	B.	58.	A.	59.	B.	60.	B.	61.	B.	62.	B.	63.	B.	64.	A.
65.	D.	66.	B.	67.	B.	68	C.	69.	C.	70.	B.	71.	B.	72.	B.
73.	B.	74.	B.	75.	B.	76.	B.	77.	C.	78.	A.	79.	C.	80.	C.
81.	A.	82.	A.	83.	C.	84.	B.	85.	A.	86.	C.	87.	A.	88.	B.
89.	B.	90.	B.	91.	A.	92.	A.	93.	A.	94.	B.	95.	A.		

Short Question Answer

1. What are the mineralogical characteristics of Gauripashana?
2. What is the concept of grahya (acceptability) and agrahyata (non-acceptability) concerning Sasyaka?
3. What shodhana (purification) techniques are employed for Kasisa?
4. What are the marana (calcination) processes for Sasyaka, and what chemical reactions occur?
5. How does temperature influence the processing of Trinkantamani?
6. Are there any notable research updates regarding the medicinal uses of Khatika?
7. How the various types of Akika categorized are based on their features?
8. What sources provide Ajashthi in nature?
9. What are the mineralogical characteristics of Jaharamohara (Serpentine)?
10. What are the mineralogical properties of Dugdhapashana (Talc)?

• • •

10 Rasadravya Parichaya - III

• Lecture: 3 hours, non-lecture: 6 hour • • Total Marks- 5 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Vaikrantha

Introduction

- Vaikranta is the second mineral drug in the Maharasa group. Also Known as Tourmaline.
- A borosilicate mineral containing elements like aluminium, iron, magnesium, sodium, lithium, and potassium.
- General formula is Mg, Mn, Fe, Ca, Na, K, Li, H, F, Al_2, B_2, Si_4, O_{10}
- Gemstone is a semi-precious stone. Derived from Sinhalese words "Thuramali" or "Thoramalli", referencing gemstones from Sri Lanka.
- It is the part of the trigonal crystal system.
- Appears as prismatic or columnar crystals with triangular cross-sections.
- Exhibits hemimorphism (asymmetrical crystal ends).
- Found in fine-grained granite like aplite, often in radial, daisy-like patterns.
- Characterized by three-sided prisms with heavy vertical striations, giving a rounded triangular appearance.

Synonyms

वैक्रान्तश्चैव विक्रान्तं वैक्रान्तं जीर्णवज्रकम्।
कुवज्रं क्षुद्रकुलिशं चूर्णवज्रञ्च तन्मतम्।। (R.T. 23/155)

Vaikranta, Vikranta, Jirnavajraka, Kuvajra, Kshurakulisha, Churnavajra.

Minerological Identification

Properties	Identification
Chemical Name	Touramaline
Chemical Composition	$Na(MgFeMnLiAl)_3 Al_6 (B_3O)_3 (Si_6O_9)$
Colour	Black
Cleavage	Prismatic Crystal
Luster	Vitreous
Streak	White
Specific Gravity	2.9 – 3.2
Hardness	7 - 7.5
Fracture	Uneven
Tenacity	Brittle
Transparency	Translucent

Sources

- **International**: Found in South Africa, Canada, Peru, Mexico, Thailand, Norway, Germany, and the United Kingdom.
- **India**: Notable deposits are located in Rajasthan and Gujarat.

Types

श्वेतः पीतस्तथा रक्तो नीलः पारावतप्रभः।
मयूरकण्ठसदृशश्चान्यो मरकतप्रभः।।
देहसिद्धिकरं कृष्णं पीते पीतं सिते सितम्।
सर्वार्थसिद्धिदं रक्तं तथा मरकतप्रभम्।
शेषे द्वे निष्फले वर्ज्ये वैक्रान्तमिति सप्तधा।। (R.R.S. 2/61–63)

1. Shveta (White)
2. Pitta (Yellow)
3. Rakta (Red)
4. Nila (Blue)
5. Paravat (Grey)
6. Mayurakanta Sadrishya (Peacock Neck)
7. Marakata (Emarald)

Grahya Lakshana

अष्टास्त्रश्चाष्टफलकः षट्कोणो मसृणो गुरुः।
शुद्धमिश्रितवर्णश्च युक्तो वैक्रान्त उच्यते।। (र.र.स. 2/53)

Ashta Asra (Eight Edges), Ashta Phalaka (Eight Surfaces, Shata Kona (Six Angles), Masruna (Soft), Guru (Heavy), Shuddha (Clear), Mishrita Varna (Multicoloured- White, Yellow, Black, Red Colour)

Doshas

अशुद्धौ वज्रवैक्रान्तौ किलासं दाहसन्ततिम्।
पार्श्वपीडां तथा पाण्डुं कुरुतस्तौ विशोधयेत्।। (Ay.Pra. 5/168)

Kilasa, Daha, Parshav Pida, Pandu.

Shodhana

Method - 01

वैक्रान्तं सपटुक्षारः कुलत्थक्वाथयोगतः।
दोलायन्त्रे परिस्विन्नः शुद्धिमाप्नोति यामतः।। (R.T. 23/161)

1. Pound the Ashuddha Vaikranta into smaller pieces.
2. Combine the Vaikranta with equal quantities of Saindhava Lavana (rock salt) and Yavaksara (alkaline salt).
3. Tie the mixture in a clean cloth to form a pottali (bundle).
4. Suspend the pottali in a Dolayantra containing Kulattha Kwatha (horse gram decoction) as the liquid medium.
5. Subject the pottali to Swedana for one yama (approximately 3 hours).
6. Remove the pottali, untie it, and wash the Vaikranta pieces with warm water to eliminate residues.
7. Dry the Vaikranta in shade or under mild heat until completely moisture-free.
8. Store the purified Shuddha Vaikranta in an airtight container for pharmaceutical use.

Method - 02

कुलत्थक्वाथसंस्विन्नो वैक्रान्तः परिशुध्यति।। (R.R.S. 2/64)

1. Pound Ashuddha Vaikranta into smaller pieces and tie it in a clean cloth to form a pottali.
2. Suspend the pottali in a Dolayantra filled with Kulattha Kwatha (horse gram decoction).
3. Heat the setup for one yama (3 hours) to facilitate purification.
4. Remove, untie, and wash the Vaikranta with warm water to eliminate residues.
5. Dry the Vaikranta thoroughly in shade or mild heat and store it in an airtight container for pharmaceutical use.

Marana

Method - 01

म्रियतेऽष्टपुटैर्गन्धनिम्बुकद्रवसंयुतः। (R.R.S. 2/67)

1. Mix equal parts of shuddha vaikranta and shuddha gandhaka in a khalva yantra.
2. Triturate the mixture thoroughly, adding Nimbu Svarasa (lemon juice) until smooth and homogeneous.
3. Dry the triturated mixture under sunlight until moisture-free.
4. Pack the dried mixture in a Sharava Samputa, sealing it securely.
5. Heat the sealed samputa in one Gajaputa and allow it to cool naturally.
6. Repeat the Bhavana, drying, and heating process for a total of eight cycles.
7. The resultant Vaikranta Bhasma should be fine, soft, and red. Store it in an airtight container for therapeutic use.

Method- 02

विमलबलिविमिश्रं चूर्णवज्रस्य चूर्णं समदरदसमेतं निम्बुनीरेण पिष्टम्।
द्विरदपुटसमाख्ये तत् पुटे संपुटस्थं वसुमितपुटपक्वं पञ्चतां याति नूनम्।। (R.T. 23/163)

1. Mix Shuddha Vaikranta, Shuddha Hingula, and Shuddha Gandhaka in equal parts in a Khalva Yantra.
2. Triturate with Nimbu Svarasa (lemon juice) until smooth and uniform.
3. Dry the mixture under sunlight until completely moisture-free.
4. Pack the dried mixture in a sealed Sharava Samputa.
5. Heat the samputa in one Gajaputa, allowing it to cool naturally.
6. Repeat Bhavana, drying, and heating for eight cycles.
7. Collect the fine, soft Vaikranta Bhasma and store it in an airtight container.

Dose

तत्त्वांशतो रक्तिकाया रुद्रांशप्रमितं मृतम्।
वैक्रान्तकं प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/170)

$1/24^{th} - 1/11^{th}$ Ratti (5 - 11 mgs)

Anupana

According to Avastha

Properties

वैक्रान्तस्तु त्रिदोषघ्नः षड्रसो देहदार्ढ्यकृत्।
पाण्डूदरज्वरश्वासकासक्षयप्रमेहनुत्।। (Ay.Pra. 5/167)

Rasa: Shad Rasa
Guna: Snigdha
Virya: Shita
Vipaka: Madhura
Dosha: Tridoshaghana
Karma: Rasayana, Vrishya, Yogavahi, Prana Prada, Balavarnakara.
Therapeutic indications: Jvara, Kushtha, Kshaya, Pandu, Shvasa, Kasa, Prameha, Shavyathu.

Probable Physico-chemical Changes

During Shodhana Process

a. Method - 1

1. Physical Changes

- **Size reduction**: The mechanical pounding of Vaikranta breaks it into smaller fragments, increasing the surface area for interaction.
- **Enhanced porosity**: Heating in Kulattha Kwatha with alkaline salts creates micro-cracks, facilitating impurity release.
- **Residue removal**: Washing eliminates surface and interstitial impurities, such as soluble salts, clay, and other unwanted particles.

2. Chemical Changes

- **Neutralization of Acidic Impurities**: Yavakshara (an alkali) reacts with acidic contaminants in Vaikranta, forming water-soluble salts through neutralization.
- **Ion Exchange Reactions**: Interaction with Saindhava Lavana and Yavakshara may result in ion replacement, such as Fe or Mg ions being substituted with Na^+ or K^+, subtly altering the mineral's composition.
- **Chelation or Dissolution of Impurities**: Organic acids, proteins, and enzymes in Kulattha Kwatha bind to metallic and non-metallic impurities, promoting their removal.
- **Thermal Effects**:
  - **Swedana (Steam treatment)**: Mild heating (~40–70°C) softens impurities, making extraction easier.
  - **Phase stabilization:** Controlled heating maintains the structural integrity of the mineral without causing decomposition.

b. Method - 2

1. Physical Changes

- **Surface Cleansing**: Kulattha Kvatha serves as a natural detergent, effectively removing surface impurities.
- **Improved Crystallinity**: Heat and hydration refine the crystalline structure of the mineral by eliminating defects.

2. Chemical Changes

- **Effects of the decoction**: Phytoconstituents in Kulattha Kvatha, such as tannins and phenolic acids, interact with metal ions or oxides in Vaikranta, dissolving or chelating impurities.
- **Toxicity reduction**: Organic compounds in Kulattha Kvatha form non-toxic complexes with toxic elements in Vaikranta, neutralizing their effects.
- **Surface hydration**: Steaming causes hydration of the mineral's surface, aiding in stabilization and impurity removal.
- **Thermal Effects**:
- **Controlled heating**: Ensures the mineral remains stable, avoiding any phase transitions or decomposition.

During Marana Process

1. Physical Changes

- **Size Reduction**: Fine grinding in Khalva Yantra enhances reactivity and heat penetration.
- **Homogeneity**: Bhavana with Nimbu Svarasa ensures uniform mixing with Gandhaka (sulfur) and Hingula (cinnabar).
- **Structural Transformation**: High heat makes Vaikranta porous and lightweight, characteristic of Bhasma.

2. Chemical Changes

- **Oxidation**: Sulfur reacts with Vaikranta to form sulfides/sulfates, detoxifying and enhancing properties.
- **Decomposition of Hingula**: Mercury vapors modify Vaikranta's chemical composition.
- **Acid-Base Reactions**: Citric acid in Nimbu Svarasa breaks down inert compounds, increasing bioavailability.
- **Compound Formation**: Heat creates stable, therapeutic mineral complexes while removing volatile impurities.

Yoga

1. Trilokyachintamani Rasa
2. Suchikabharana Rasa
3. Vastana Kushmakara Rasa
4. Ratnaprabha Vati
5. Apurvamalini Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Studies on Identification of 'Vaikranta' Used in Ayurveda	V.N.Sharma, Banaras Hindu University, Varanasi-221005-U.P. India	Schorlite, Indicolite, and Rubellite share physical traits with Vaikranta but differ chemically, with Schorlite lacking B_2O_3, FeO, and MgO, and having more SiO_2, Na_2O, and K_2O. As all three are Tourmaline varieties, Vaikranta in Ayurveda is likely a form of Tourmaline.
2.	Physico-chemical study of Vaikranta bhasma	R. Tripathi, Departments of Rasa Shastra and Bhaishajya Kalpana, R.G.G.P.G. Ayurvedic College and Hospital, Paprola, H.P.	The data shows Vaikranta Bhasma is a multi-mineral compound with iron and silica as major elements, and others present in trace amounts. Ayurvedic tests, combined with modern tools, can be used to set quality standards. EDAX analysis confirmed elements like C, O, Na, Fe, and others, supporting its aphrodisiac and rejuvenative properties. SD analysis revealed 10% of particles were below 5.12 µm, 99% below 114.16 µm, with an average size of 33.8 µm, indicating that fine particle size is achievable through proper processing.
3.	A Conceptual Review on Vaikrant	Dr. Shweta Chauhan, M.D. Rasa Shashtra Evum Bhaishajya Kalpana, Govt. Ayurvedic Medical College, Akhnoor, Jammu, India.	This paper provides a brief overview of Vaikranta, covering its etymology, equivalents, pharmacological properties, types, and the processes of Shodhana (purification), Marana (incineration), and Satvapatana (extraction of essence).
6.	Comparative Pharamceutical Study Of Prepared From Two Different Sources	Kavya N, PG Scholar, Department of Post-graduate studies in Rasashastra and Bhaishajya Kalpana, SDM College of Ayurveda, Kuthpady, Uddupi, Karnataka.	Although classical texts prescribe 8 putas for Vaikranta Bhasma, the Bhasma Lakshana were fully achieved after 14 putas. Despite the two samples starting with different colors, by the 14th puta, the resulting Bhasma showed no color variation. After Marana, both samples of Vaikranta Bhasma shared the same mud-brown hue.

Vimala (Iron Pyrite)

Introduction

- Vimala is the fourth mineral drug in the Maharasa group.
- It is part of the pyrite mineral family.
- The name "pyrite" is derived from the Greek word purites, meaning "of fire" or "in fire."
- It is an iron sulfide and one of the most prevalent sulfide minerals.
- Iron pyrite is inherently unstable and undergoes continuous formation or decomposition in natural environments.
- Exposure to air and water leads to its breakdown into iron oxides and sulfate.
- Acidithiobacillus bacteria enhance the oxidation process, producing ferrous iron and sulfate.
- This reaction is faster in fine pyrite crystals or dust, commonly found in mining operations.
- The oxidation of pyrite generates substantial heat.
- This heat can cause spontaneous combustion in high-sulfur coal seams within abandoned mines.
- Abandoned mining areas are hermetically sealed to minimize oxygen exposure, reducing the combustion risk.

Synonyms

Not mentioned in any classical references.

Mineralogical Identification

Properties	Identification
Chemical Name	Iron Pyrite
Chemical Composition	FeS_2
Colour	Pale Brass, Yellow, Dull Gold
Cleavage	Indistinct
Luster	Metallic
Streak	Greenish Black
Specific Gravity	4.8- 5.2
Hardness	6 – 6.5
Fracture	Uneven
Tenacity	Brittle

Sources

- Vimala found in hydrothermal veins, igneous rocks, magmatic segregations, and massive deposits.
- Italy, Spain, the United States, the United Kingdom, Japan, and Canada.
- Significant deposits are in Bihar, Kashmir, Assam, Odisha, Madhya Pradesh, West Bengal, Tamil Nadu, Andhra Pradesh, and Karnataka.

Types

विमलस्त्रिविधः प्रोक्तो हेमाद्यस्तारपूर्वकः।
तृतीयः कांस्यविमलस्तत्तत्कान्त्या स लक्ष्यते।। (R.R.S. 2/95)

1. Hema Vimala
2. Tara Vimala
3. Kamsya Vimala

Grahya Lakshna

वर्तुलः कोणसंयुक्तः स्निग्धश्च फलकान्वितः। (R.R.S. 2/96)

- The 'Hema Vimala' is found in cubic, golden-colored fragments.
- It typically has six to eight facets with multiple sharp angles.
- Its surface is smooth and feels soft to the touch.
- When subjected to fire, it releases a characteristic sulfurous odor as it burns.

Shodhana

आढ्यरूषजले स्विन्नो विमलो विमलो भवेत्।
जम्बीरस्वरसे स्विन्नो मेषशृङ्गीरसेऽथवा।।
आयाति शुद्धिं विमलो धातवश्च यथाऽपरे। (R.R.S. 2/98-99)

1. Tie the required quantity of Vimala in a clean cloth to form a pottali.
2. Suspend the pottali in a Dolayantra with Vasa Svarasa/Kvatha as the liquid medium and subject it to steaming/boiling.
3. Use Jambira Rasa (lemon juice) or Meshashringi Rasa (Gymnema sylvestre juice) as alternative Svedana mediums.
4. Remove the pottali, untie it, and wash the Vimala with warm water to eliminate impurities.
5. Dry the purified Vimala in shade or mild heat and store it in an airtight container for pharmaceutical use.

Marana

गन्धाश्मलकुचाम्लैश्च म्रियते दशभिः पुटैः।। (R.R.S. 2/100)

1. Mix equal parts of Shuddha Vimala and Shuddha Gandhaka.
2. Grind the mixture in a Khalva Yantra with Lakucha Rasa to form a homogeneous paste.
3. Shape the paste into small Chakrikas (pellets).
4. Sun-dry or gently heat the Chakrikas to remove moisture.
5. Pack the dried Chakrikas in a sealed Sharava Samputa (clay crucible).
6. Heat in a Gajaputa (traditional furnace) and allow to cool naturally.
7. Repeat the process (Bhavana, Chakrika formation, drying, and Puta) 10 times.
8. Ensure the Vimala Bhasma is fine, soft, and meets quality standards before storage.

Dose

½ - 2 Ratti (63 – 250 mgs)

Anupana

Triphala, Trikatu, Vidanga, Madhu.

Properties

मरुत्पित्तहरो वृष्यो विमलोऽतिरसायनः।। (R.R.S. 2/96)
विमलाया गुणाः किञ्चिन्यूनाः कनकमाक्षिकात्।।
(Ay.Pra. 4/24)

- Properly prepared Vimala Bhasma effectively pacifies the vitiated Pitta Dosha.
- It acts as a potent aphrodisiac and a powerful rejuvenator.
- Its properties closely resemble those of Svarna Makshika Bhasma.

Therapeutic Indications: Pandu, Prameha, Shula, Aruchi, Shotha, Arsha, Bhagandara, Rajyakshma.

Probable Physico-Chemical Changes

During Shodhana Process

1. Physical Changes

- **Softening**: Steaming makes Vimala porous and easier to process.
- **Surface Purification**: Washing removes physical and toxic surface impurities.
- **Color and Texture Changes**: Improved brightness and uniformity indicate detoxification.
- **Reduced Brittleness**: Heat exposure makes Vimala less brittle for further processing.

2. Chemical Changes

- **Acid Reactions**: Jambira or Meshashringi Rasa breaks down harmful oxides and impurities.
- **Chelation**: Herbal mediums chelate metallic ions, neutralizing toxicity and improving bio-availability.
- **Oxidation/Reduction**: Converts toxic metals into inert forms or removes them.
- **Leaching**: Steaming extracts soluble impurities like salts.

During Marana Process

1. Physical Changes

- **Size Reduction**: Repeated processing reduces Vimala to an ultra-fine powder, improving bioavailability.
- **Porosity and Homogeneity**: Increases porosity and evenly distributes Gandhaka and Lakucha Rasa.
- **Texture and Color**: Final product becomes soft, smooth, and reddish or golden due to chemical reactions.

2. Chemical Changes

- **Metallic Sulfide Formation**: Gandhaka converts metallic components into stable sulfides, reducing toxicity.
- **Oxidation-Reduction**: Heating cycles stabilize the mineral structure via controlled oxidation and reduction.
- **Acid Detoxification**: Organic acids in Lakucha Rasa chelate and neutralize toxic elements.
- **Impurity Removal**: Heating eliminates volatile impurities and stabilizes mineral compounds.

Yoga

1. Kshayakesari Rasa
2. Rasendra Chudamani Rasa
3. Navaratna Rajamriganka Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Vimal (Iron Pyrite): A Medicinal Mineral Drug of Ayurveda - An Approach to Develop Its Mineralogical Monograph	Prem Shanker Pandey, Department of PG Studies in Rasa Shastra, Shri Jagadguru Gavisiddheshwar Ayurvedic Medical College, Koppal, Karnataka, India.	The results indicate that Vimal is iron pyrite (FeS_2), displaying metallic luster, a pale dull gold color, cubic crystal structure, and uneven fracture. These physical properties closely align with the characteristics of Vimal described in Ayurvedic classics.

Chapala

Introduction

- Chapala is the seventh mineral drug in the Maharasa group.
- Its ore identification remains ambiguous.
- Most commonly associated with Selenium (Se) rather than Bismuth (Bi).
- Selenium: Atomic number 34, atomic mass 78.96.
- The name originates from the Greek word selene (moon).
- Selenium was discovered in 1817 by Jons Jakob Berzelius, and its characteristics suggest its potential identification as Capala in ancient Rasashastra.
- Hexagonal particles of Capala resemble those of Selenium.
- Its melting point (217°C) is closer to tin (232°C) than Bismuth (271°C).
- Selenium's greyish hue aligns with descriptions of Gaura Chapala.

Synonyms

According to Rasarnava- Shaila.

Minerological Identification

Properties	Identification
Chemical Name	Selenium
Chemical Composition	Se
Colour	Gray, Red, Reddish Gray

Properties	Identification
Cleavage	Good
Luster	Metallic
Streak	Red
Specific Gravity	4.8- 5.1
Hardness	2
Fracture	Flexible

Sources

- **यत्र जातौ नागवङ्गौ: चपलस्तत्र जायते** (Br.R.Raj.Sun., p. 115)
  Chapala is typically found in regions where Naga (Lead) and Vanga (Tin) are present.
- According to Ayurveda Prakasha, Chapala is found in the mines of Makshika.
- Bismuth is primarily found in Australia, Bolivia, China, Vietnam, Japan, and Mexico. Among these, China stands out as the leading producer, accounting for 90% of the global demand for Bismuth.
- Selenium is rarely found in its uncombined form and is typically associated with Copper and Sulphur, particularly in copper pyrite. It is also present in ores as selenides, occurring alongside sulfides in the ores of Iron, Lead, and Silver.

Types

A. According to Rasa Ratna Samuchchaya & Rasa Tarangini

गौर: श्वेतोऽरुण: कृष्णश्चपलस्तु चतुर्विध:।
हेमाभश्चैव ताराभो विशेषादसबन्धन:।।
शेषौ तु मध्यौ लाक्षावच्छीघ्रद्रावौ तु निष्फलौ।
(R.R.S. 2/142-143), (R.T. 9/63-64)

Sr. No.	Types	Colour	Utility
1.	Gaura Chapala	Yellowish Gold	Parada Bandhana
2.	Shveta Chapala	White	
3.	Aruna Chapala	Reddish Brown	Therapeutic Purpose.
4.	Krishna Chapala	Blackish	

B. According to Rasakamadhenu

1. Svarna Chapala
2. Tara Chapala
3. Tamra Chapala
4. Naga Chapala
5. Vanga Chapala
6. Tikshana Chapala

C. According to Rasapaddhati

चत्वारश्चपला: सितासितहरिच्छ्रेणप्रभेदै: पुन:।
(R.Paddhati Maharasa Prak.)

1. Sita Chapala
2. Asita Chapala
3. Harita Chapala
4. Sona Chapala

Grahya Lakshna

चपल: स्फटिकच्छाय: षडश्र: स्निग्धको गुरु:।
(R.R.S. 2/145) (R.T. 9/66)

1. **Sphatika Chaya**: Potash Alum
2. **Shadasra**: Six Angles
3. **Snigdha**: Unctuous
4. **Guru**: Heavy

Shodhana

जम्बीरककोंटक शृङ्गवेरैर्विभावनाभिश्चपलस्य शुद्धि:।।
(R.R.S. 2/146) (R.T. 9/67)

1. Place the Chapala drug in a clean Khalva Yantra (mortar).
2. Subject the Chapala to three cycles of Bhavana (wet grinding or incorporation).
3. Use one of the following fresh juices for each Bhavana:
   - Jambira Nimbu Svarasa (lemon juice)
   - Karkotaka Svarasa (juice of Karkotaka plant)
   - Ardraka Svarasa (ginger juice)
4. Repeat the process until purification is complete, ensuring the drug is thoroughly treated and safe for use.

Marana

1. Place Shuddha Chapala (purified Capala) in a clean Khalva Yantra (mortar).
2. Mix an equal quantity of Shuddha Gandhaka (purified sulfur) with it.
3. Triturate thoroughly to create a uniform mixture.
4. Perform one Bhavana (wet grinding) using Nimbu Svarasa (lemon juice).
5. Transfer the resulting dry mixture into a crucible.
6. Heat the crucible intensely for one full day in a Baluka Yantra (sand furnace).
7. Allow the crucible to cool naturally.
8. Collect the red-colored Chapala Bhasma after cooling.

Dose

According to Rasa Yoga Sagara- 1 Ratti

Anupana

Madhu, Ghrita, Dugdha

Properties

चपलो लेखन: स्निग्धो देहलोहकरो मत:।
रसराजसहाय: स्यात् तिक्तोष्णमधुरो मत:।।
त्रिदोषघ्नोऽतिवृष्यश्च रसबन्धविधायक:।।
(R.R.S. 2/144-145) (R.T. 9/65-66)

Rasa: Madhura, Tikata
Guna: Snigdha, Ushna
Virya: Ushna
Doshas: Tridoshaghana
Karma: Rasayana, Vrishya, Parada Bandhana
Therapeutic Indications: Gulma, Shula, Shosha, Prameha, Jvara, Shvetapradara, Rakta Pradara.

Probable Physico-Chemical Changes

During Shodhana Process

The Shodhana (purification) process using juices like Jambira Nimbu Svarasa (lemon juice), Karkotaka Svarasa, and Ardraka Svarasa (ginger juice) induces key transformations in the Chapala drug:

- **Acidic and Enzymatic Reactions**: Citric acid dissolves impurities, promotes chelation, and coats Chapala particles. Enzymes and antioxidants trigger redox reactions and simplify organic impurities.
- **Particle Size Reduction**: Bhavana reduces particle size, increases surface area, removes impurities, and homogenizes the substance.
- **Detoxification**: Toxic elements are neutralized, converted to inert forms, or volatilized.
- **Chemical Alteration**: Bioactive compounds (e.g., gingerol, flavonoids) stabilize, detoxify, and enhance therapeutic potential.
- **Therapeutic Enhancement**: Herbal juices add anti-inflammatory and antimicrobial effects, boosting potency and safety.
- **Physical Impurity Removal**: Dust and debris are removed during grinding and filtration. This process purifies, detoxifies, and enhances Chapala's efficacy and safety.

During Marana Process

- **Mixing with Sulfur**: Sulfur acts as a reducing agent, forming stable metal sulfides. Homogeneous mixing and reduced particle size improve reactivity.
- **Bhavana with Lemon Juice**: Citric acid converts impurities into soluble salts and further reduces particle size. Prepares Chapala for uniform heat reactions.
- **Heating in Valuka Yantra**: Dehydration, melting, and removal of volatile impurities occur. Stable metal sulfides form, and unstable compounds decompose. Oxidation-reduction reactions stabilize the final product.
- **Cooling and Collection**: Formation of red-colored Chapala Bhasma, a fine, bioavailable ash with stable, non-toxic compounds.

Yoga

1. Chapala Rasa
2. Purna Chandro Rasa
3. Trilokyaadambara Rasa
4. Svarana Jvaradi Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Chapala Nirnaya – An Experimental Study to Identify the Chapala	Prasanna Mathad, Dept. of Rasa Shastra Evam Bhaishjya Kalpana, Parul Institute of Ayurved and Research, Parul University, Gujarat, India.	This study suggests that the origin, occurrence, and physical properties of Chapala align more closely with Selenium than Bismuth, indicating that Selenium can be considered as Chapala.
2.	A Review on Chapala- A Controversial Mineral In Indian Alchemy	HUSSAIN G, Associate Professor, Dept. of Rasashastra & Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka.	The research article identifies Chapala as the mineral Bismuth, characterized by its metallic luster, high specific gravity, elevated melting point, hexagonal crystal structure, and unseen fracture. These attributes of Bismuth closely align with the properties of Chapala as described in Rasashastra texts.
3.	Safety Profile of Chapala Bhasma With Special Reference to Bismuth and Selenium Safety Profile of Chapala Bhasma with Special Reference to Bismuth and Selenium	Prasanna Mathad, Dept. of Rasa Shastra Evam Bhaishjya Kalpana, Parul Institute of Ayurved and Research, Parul University, Gujarat, India.	This study aimed to evaluate the safety profile of Chapala Bhasma (clax) concerning Bismuth and Selenium through an oral toxicity assessment. The study involved Bismuth and Selenium clax, conducted following OECD guidelines. The histopathological analysis revealed significant changes in the Bismuth clax, while the Selenium clax exhibited fewer alterations. Chapala Bhasma prepared with Bismuth and Selenium demonstrated nontoxicity, with Selenium clax exhibiting a superior safety profile compared to Bismuth clax.

Rasaka

Introduction

- Rasaka, a mineral closely associated with Yashada (zinc), occupies a notable position in ancient Indian metallurgical and medicinal practices.
- Yashada is derived from Rasaka through the Sattvapatana (metal extraction) method, as reflected in its synonym Ritikrit in classical texts.
- The term "Riti" connects to Pittala (brass), an ancient alloy composed of zinc and copper.
- Historical and textual evidence suggests that while pure zinc was not known before the 14th century CE, ancient scholars proficiently utilized Rasaka or Kharpara to extract zinc content for making alloys like Pittala.
- The Rasa Ratna Samuchchaya classifies Pittala as a Mishra Loha (composite metal), highlighting its alloyed nature.
- Ancient metallurgists likely extracted zinc from Rasaka or Kharpara and alloyed it with copper to create brass. According to Rasendra Chudamani, Rasaka's Sattva (essence) is described as having a resemblance to Vanga (tin).
- Similarly, classical Ayurvedic texts like Charaka Samhita and Sushruta Samhita indirectly refer to Rasaka in their descriptions of minerals like Tuttha (copper sulfate), including varieties such as Mayuragriva and Kharparika Tuttha.
- Mineralogically, Rasaka is commonly found as Sphalerite (zinc sulfide) and Smithsonite (zinc carbonate). Other zinc-bearing minerals, such as Zincite (zinc oxide), were also employed for their medicinal and alchemical applications, demonstrating Rasaka's versatility and significance in ancient science.

Synonyms

खर्पर: खर्परश्चैव तदेव खर्परीयकम्।
रसको रसकश्चैव मतं यशदकारणम्।। (R.T. 21/181)
गोभद्रो रसकस्तुत्थं: क्षितिकिट्टो रसोद्भव:। (Rasarnv. 7/37)
Kharpara, Kharpariyaka, Rasaka, Yashadakarana, Gobhatta, Gobaddha, Kshitikitta.

Minerological Identification

Properties	Identification
Chemical Name	Zinc Oxide
Chemical Composition	ZnO
Colour	Dark Red, Orange
Cleavage	Perfect
Luster	Vitreous
Streak	Yellowish Orange
Specific Gravity	5.7
Hardness	4 - 4.5
Fracture	Conchoidal
Tenacity	Brittle

Sources

- Abundant Mines in India
- Rajasthan is a significant source of Rasaka ores.
- **Other Indian states include:** Bihar, Bengal, Kashmir, Punjab, Sikkim, and Himachal Pradesh.
- **Global Sources:** USA, Australia, France, Spain, Myanmar.

Types

मृत्तिका गुडपाषाणभेदतो रसकस्त्रिधा।
पीतस्तु मृत्तिकाकारो मृत्तिकारसको वर:।।
गुडाभो मध्यमो ज्ञेय: पाषाणाभ: कनिष्ठक:।
(Rasarnv. 7/28-29)

1. **Mritikaabha Rasaka (ZnO)** : Like Muddy- Best Variety.
2. **Gudaabha Rasaka (ZnS)**: Like Jaggery
3. **Pashanabha Rasaka ($ZnCaCO_3$)**: Like Stone

रसको द्विविधः प्रोक्तो दर्दुरः कारवेल्लकः।
सदलो दर्दुरः प्रोक्तो निर्दलः कारवेल्लकः।।
सत्त्वपाते शुभः पूर्वो द्वितीयश्चौषधादिषु।।
(R.R.S. 2/149-150)

1. Durdana Rasaka- Layers Form
2. Karvellaka Rasaka- Pind Form

खर्परो द्विविधः प्रोक्तः सदलो निर्दलस्तथा।
सदलो दर्दुराख्यः स्यात्कारवेल्लाभिधोऽपरः।।
खर्परं दर्दुराख्यन्तु योजयेत्सत्त्वपातने।
औषधेषु च सर्वत्र कारवेल्लं प्रयोजयेत्।। (R.T. 21/183-84)

1. Sadala- Layers Form
2. Nirdala- Pind Form

Grahya Lakshana

खर्परोऽतिखरश्चैव सदलो निर्दलस्तथा।
मृत्तिकाभश्च पीताभो भाराढ्यश्चेह शस्यते।। (R.T. 21/182)

1. Aati Khara- Rough
2. Sadala Nirdala- with or without layers.
3. Mrittikaabha- Appears like mud
4. Pitaabha- Yellow in colour
5. Bhaaradaya- Heavy

Doshas

अशुद्धखर्परः कुर्याद्भ्रान्तिं भ्रान्तिं विशेषतः।
तस्माच्छोध्यः प्रयत्नेन यावद्भ्रान्तिविवर्जितः।। (Ay.Pra. 2/283)

Vomiting, Giddiness due to consumption of impure or improperly purified Rasaka.

Shodhana

Method 01

प्रस्तरांशपरित्यक्तं खर्परं त्यथ खल्वगम्।
निम्बूकस्वरसोपेतं पेषयेत्सप्तवारकम्।। (R.T. 21/186)

1. Select pieces of Kharpara (Rasaka), ensuring they are free from physical impurities.
2. Grind them into a fine powder using a Khalva Yantra (mortar).
3. Perform seven cycles of Bhavana (incorporation) using Nimbu Svarasa (lemon juice) as the liquid medium.
4. After completing the seventh Bhavana, mix the drug with sufficient water and allow it to settle.
5. Carefully decant the water to remove impurities.
6. Dry the purified Kharpara under direct sunlight until completely moisture-free.
7. Grind the dried substance into a fine powder, and store it in an airtight container labeled as Shuddha Kharpara.

Method 02

खर्परः परिसन्तप्तस्तक्रे वा गृहवारिणि।
निषिक्तः सप्तवारं तु विमलत्वमवाप्नुयात्।। (R.T. 21/189)

1. Collect pieces of Kharpara (Rasaka), ensuring they are free from visible impurities.
2. Heat the Kharpara pieces until they become red-hot.
3. Immediately immerse the red-hot Kharpara into Takra (buttermilk) or Kanji (fermented gruel water).
4. Repeat the heating and quenching process seven times.
5. After seven cycles, the Kharpara is considered purified and ready for further use (Shuddha Kharpara).

Marana

Method - 01

खर्परं पारदेनैव चूर्णयित्वा दिनं पचेत्।
बालुकायन्त्रमध्यस्थं शोणं भस्म प्रजायते।। (Ay.Pra. 2/289)

1. Take 2 Pala (96 grams) of Shuddha Kharpara (purified Kharpara) in a clean Khalva Yantra (mortar).
2. Add an equal quantity of Shuddha Parada (purified mercury).
3. Triturate the mixture thoroughly until a fine powder is obtained.
4. Transfer the prepared powder into a Sharava Samputa (lidded crucible).
5. Seal the Samputa securely to prevent leakage during the heating process.
6. Place the sealed Samputa in a Baluka Yantra (sand furnace).
7. Heat it intensely for one full day.
8. Allow the Samputa to cool naturally.
9. Open the cooled Samputa and collect the soft, yellowish, and visually appealing drug material inside.
10. Triturate the collected material again to ensure a uniform and fine consistency.
11. Store the prepared Kharpara Bhasma in an airtight container for future use.

Method - 02

खर्परो विमलः शुद्धस्तुल्यतालकपेषितः।
सम्पुटस्थस्त्रिपुटितः सर्वथा मृतिमाप्नुयात्।। (R.T. 21/193)

1. Take Shuddha Kharpara (purified Kharpara) and mix it with an equal quantity of Shuddha Haratala Churna (purified orpiment powder).
2. Triturate the mixture thoroughly to ensure uniform consistency.
3. Place the prepared mixture into a Sharava Samputa (lidded crucible).
4. Seal the Samputa securely to prevent any material loss during the heating process.
5. Subject the sealed Samputa to Laghu Puta (mild heating) using dry natural cow dung cakes as the heat source.
6. Once cooled, open the Samputa and mix the resultant product with an equal quantity of Shuddha Haratala.
7. Triturate the new mixture and repeat the Puta process twice more, for a total of three heating cycles.
8. After the third Puta, allow the Samputa to cool naturally.
9. Open the Samputa and collect the prepared Kharpara Bhasma.
10. Triturate the collected Kharpara Bhasma to achieve a uniform texture.
11. Store the finished product in an airtight container for future use.

Dose

गुञ्जार्द्धतः समारभ्य गुञ्जाद्वितयसम्मिता।
खर्परस्य मता मात्रा रोगापनयनक्षमा।। (R.T. 21/197)

Half ratti (62 mgs) to two ratti (250 mgs)

Properties

सुमृतः खर्परः शीतः कफपित्तापहः परम्।
चक्षुष्यः सर्वमेहघ्नो रक्तप्रदरनाशनः।।
रक्तपीत्ताश्मरीश्वासगुदामयनिषूदनः।
जीर्णज्वरहरः कामं त्वतीसारनिबर्हणः।।
योगवाही विशेषेण त्रिदोषघ्नो विषापहः।
विचर्चिकाकुष्ठहरो बलवीर्यविवृद्धिकृत्।। (R.T. 21/194-96)
खर्परं कटुकं क्षारं कषायं वामकं लघु।
लेखनं भेदनं शीतं चक्षुष्यं कफपित्तनुत्।।
विषाश्मकुष्ठकण्डूनां नाशनं परमं मतम्।।
(Ay.Pra. 2/279-280)

Rasa: Katu, Kashaya
Guna: Laghu, Ruksha
Virya: Shita
Vipaka: Katu
Dosha: Kaphapittahara
Karma: Balavardaka, Viryavardhaka, Yogavahi, Vishaghana
Therapeutic Indications: Kshaya, Meha, Kushtha, Raktapitta, Kasa, Shvasa, Jirna Jvara, Aatisara, Gulma.

Probable Physico-Chemical Changes

During Shodhana Process

Method 01 (Bhavana with Lemon Juice)

1. **Physical**: Particle size reduction, impurities separated, drying.
2. **Chemical**: Acidic lemon juice neutralizes toxins, forms soluble salts.

Method 02 (Heating and Quenching)

1. **Physical**: Heating softens, quenching fractures Kharpara.
2. **Chemical**: Organic acids neutralize toxic compounds, stabilize the material.

During Marana Process

a. Method 01 (Heating with Parada in Sand Furnace)

1. Physical Changes

- Grinding increases surface area, enhancing reactivity.
- Sealing and heating cause thermal expansion and amalgamation of mercury with Kharpara.

2. Chemical Changes

- Mercury forms bioavailable amalgams with Kharpara.
- Heat breaks down impurities, converting them into volatile compounds.
- Sublimation of mercury purifies the substance, converting it into bhasma.

b. Method 02 (Heating with Haratala in Laghu Puta):

1. Physical Changes

- Grinding ensures uniform mixing.
- Mild heating and repeated cycles cause structural changes in Kharpara and Haratala.

2. Chemical Changes

- Haratala reacts with Kharpara, forming stable arsenical compounds.
- Decomposition of Haratala removes toxic substances, creating a purified bhasma.

Yoga

1. Lakshmivilasa Rasa
2. Kasturi Bhairava Rasa
3. Vasanta Malati Rasa
4. Pradarantaka Rasa
5. Vaidyanatha Vati

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Preparation and physicochemical analysis of Rasaka Bhasma	Shubha H. S; Post Graduate Scholar, Department of Rasashastra, Assistant Professor, Department of Rasashastra and Bhaishajya Kalpana, KLE's Sri BMK Ayurveda, Mahavidyalaya, Shahapur, Belgaum, Karnataka, India	The prepared Bhasmas underwent qualitative and quantitative analysis, revealing minimal differences in Loss on Drying (LOD) but notable variations in pH at different stages. For zinc carbonate ($ZnCO_3$), the pH values were 8.73 before Shodhana, 7.79 after Shodhana, and 7.73 after Marana. For zinc oxide (ZnO), the pH values were 6.04 before Shodhana, 6.48 after Shodhana, and 5.9 after Marana. The zinc content in $ZnCO_3$ was 48.95% before Shodhana, 47.26% after Shodhana, and 53.59% after Marana, indicating an increase due to calcination. In contrast, ZnO showed zinc percentages of 85.38% before Shodhana, 86.10% after Shodhana, and 69.51% after Marana, reflecting a decrease attributed to oxidative reactions.
2.	Evaluation of antimicrobial activity of Rasaka Bhasma	Shubha H. S., Department of Rasashastra, KLE's Sri B. M. K. Ayurveda Mahavidyalaya, Shahapur, Belgaum, Karnataka, India	The antimicrobial efficacy of Rasaka Bhasma derived from $ZnCO_3$ demonstrated superior results compared to that prepared from ZnO. Specifically, the Bhasma made from $ZnCO_3$ exhibited enhanced activity against *Streptococcus pyogenes* at a concentration of 50 µl, outperforming its effects on other organisms.

Anjana

Introduction

- Drugs of Anjana set ranks seventh among the uparasa group.
- In English, they are called 'stibnite' or 'antimonite.' Antimonite, or stibnite, is a sulphide mineral with a formula of Sb_2S_3.
- This grey, soft material crystallizes in an orthorhombic space group.
- It is the principal source of the metalloid antimony.
- The name comes from the Greek stibi via the Latin stibium as the ancient name of the mineral and the element antimony.
- It is potentially toxic, being a special-purpose antimony sulphide, and should be handled with care.

Synonyms

1. **Sauviranjana**: Souvira, Suriraja, Krishnajana & Kalanjana
2. **Rasanjana**: Rasagabha, Rasagraha, Rasobhava, Tarkshya, Tarkshyashaila, Kataka, Bala-bhaishajya, Darvikwathodbhava, Agnisara.
3. **Srotoanjana**: Srotaja, Yamuneya, Yamuna, Nilanjana, Kapotanjana.
4. **Pushpanjana**: Kusumanjana, Pushpaketu, Koustubha, Ritika and Ritipushpaka.
5. **Nilanjana**: Shukrabhumija, Vaisambhava, Suvarnaghana and Lauhamardavakara.

Minerological Identification

Properties	Identification
Chemical Name	Stibnite
Chemical Composition	Sb_2S_3
Colour	Lead Gray
Cleavage	Perfect
Luster	Metallic
Streak	Similar to colour but darker
Specific Gravity	4.65
Hardness	2
Fracture	Subconchoidal
Tenacity	Brittle
Transparency	Opaque

Sources

- Most stibnite deposits are small, while only a few are large.
- These occur in Canada, Mexico, Peru, Japan, China, Germany, Romania, Italy, France, England, and Algeria.
- In the United States, stibnite is found in California, Idaho, Arkansas, Alabama, and Alaska.
- In India, small deposits are located in Jammu and Kashmir, Bihar, and Punjab.

Types

सौवीरमञ्जनं प्रोक्तं रसाञ्जनमतः परम्।
स्रोतोऽञ्जनं तदन्यच्च पुष्पाञ्जनकमेव च।
नीलाञ्जनं च तेषां हि स्वरूपमिह वर्ण्यते।। (R.R.S. 3/98)

1. Sauviranjana
2. Rasanjana
3. Srotoanjana
4. Pushpanjana
5. Nilanjana

अञ्जनं द्विविधं ज्ञेयं स्रोतोजञ्च सुवीरजम्।। (R.T. 22/35)

1. Srotoanjana
2. Sauviranjana

तत्र स्रोतोऽञ्जनं कृष्णं सौवीरं श्वेतमीरितम्। (Ay.Pra. 2/226)

1. Shveta Anjana
2. Krishna Anjana

Grahya Lakshana

1. Sauviranjana

बाह्यतः खलु धूमाभं भङ्गे त्वतिसमुज्ज्वलम्।
घर्षे खलु मधीवर्णं सौवीराञ्जनमुच्यते।। (R.T. 22/39)

When broken, anjana reveals a very shiny inner part, and when scraped on a rough surface, it leaves blackish lines. Such a variety of añjana, characterized by its dhumra Varna (smoke-like color), is referred to as souviranjana.

2. Rasanjana

रसाञ्जनं च पीताभं। (R.R.S. 3/103)

Pita Varna- Yellowish colour.

3. Sroto-anjana

भङ्गे नीलोत्पलनिभं घर्षणे गैरिकप्रभम्।
वल्मीकशीर्षप्रतिमं मतं स्रोतोऽञ्जनं बुधैः।। (R.T. 22/38)

The sroto-anjana is identified by its resemblance to ant hills in shape, its appearance of nila kamala (blue lotus) color when broken, and the reddish streaks it leaves when rubbed on a rough surface, similar to gairika.

4. Pushpanjana

पुष्पाञ्जनं सितम्। (R.R.S. 3/105)

Shveta Varna- White in colour.

5. Nilanjana

- Varna- Nila (Blue colour)
- Guna- Guru (Heavy)

Shodhana

General Method

अञ्जनानि विशुद्ध्यन्ति भृङ्गराजनिजद्रवैः। (R.R.S. 3/105)

1. Obtain bhrigaraja svarasa (juice extract of bhrigaraja) and the anjana to be purified.
2. Begin the process of bhavana by thoroughly mixing the anjana with bhringaraja svarasa until it forms a consistent paste.
3. Allow the mixture to dry naturally, ensuring it is exposed to appropriate conditions.
4. Repeat the process of applying bhrigaraja svarasa and drying a total of seven times to ensure complete purification.
5. After the seventh bhavana, check the purified anjana for consistency and readiness for use.

Sauviranjana & Srotoanjana

1. Tie Sroto-Anjana and Sauviranjana in separate cloth bundles (pottali).
2. Suspend the pottali bundles in a dolayantra and subject each to svedana (steam treatment) for one yama (3 hours) using either triphala kvatha or bhringaraja svarasa.
3. Remove the bundles, allow the contents to dry thoroughly.
4. Store the purified materials in separate airtight containers, labelled as shuddha sroto-anjana and shuddha sauviranjana.

Neelanajana

नीलाञ्जनं चूर्णयित्वा जम्बीररसभावितम्।
दिनैकमातपे शुद्धं भवेत्कार्येषु योजयेत्।। (Ay.Pra. 2/238)

1. Place Nilanjana in a clean khalva yantra (mortar).
2. Add the required amount of Nimbu Swarasa (lemon juice) and triturate thoroughly for one day.
3. Dry the mixture under the hot sun until fully dehydrated.

4. Store the purified Nilanjana in a suitable airtight container, labelled as Shuddha Nilanjana.

Marana

Not Required

Dose

गुञ्जार्धतः समारभ्य गुञ्जैकमितमञ्जनम्।
दिनद्वयं त्रयं वापि प्रयुञ्जीत भिषग्वरः।।
अञ्जनद्वितयं रक्तप्रदरे तु दिनत्रयात्।
अधिकं नोपयुञ्जीत रसतन्त्रविशारदः।। (R.T. 22/47-48)

Dose: ½ - 1 ratti (62 mgs - 125 mgs)

Properties

1. Sauviranjana

सौवीरमञ्जनं ग्राहि स्निग्धञ्च तुहिनोपमम्।
रक्तपित्तप्रशमनं नेत्रामयहरं परम्।।
विषहिक्कापहं कामं व्रणशोधनरोपणम्।
परं रजोरोधकरं रक्तप्रदरनाशनम्।। (R.T. 22/45-46)
सौवीरमञ्जनं धूम्रं रक्तपित्तहरं हिमम्।
विषहिध्मादिरोगघ्नं व्रणशोधनरोपणम्।। (R.R.S. 3/100)

Rasa: Katu, Kashaya, Tikta
Guna: Snigdha
Virya: Shita
Vipaka: Madhura
Dosha: Tridoshahara
Therapeutic Indications: Hikka, Vamana, Kshaya, Vrana, Raktapitta.

2. Rasanjana

रसाञ्जनञ्च पीताभं विषवक्त्रगदापहम्।
श्वासहिध्मापहं वर्ण्यं वातपित्तास्रनाशनम्।। (R.R.S. 3/101)

Rasa: Madhura, Tikta, Katu
Guna: Snigdha
Virya: Shita
Dosha: Tridoshahara
Karma: Netraya, Varnaya, Vishaghana
Therapeutic Indications: Hikka, Shvasa, Visha, Mukha Roga, Netra Roga.

3. Sroto-anjana

स्रोतोऽञ्जनं तु शिशिरं तुवरं लेखनं परम्।
स्निग्धं स्वादु परं ग्राहि कफपित्तविषापहम्।।
रक्तपित्तक्षयहरं नेत्रामयनिषूदनम्।
हिक्काच्छर्दिप्रशमनं स्तन्यवृद्धिकरं परम्।। (R.T. 22/43-44)
स्रोतोऽञ्जनं हिमं स्निग्धं कषायं स्वादु लेखनम्।
नेत्र्यं हिध्माविषच्छर्दिकफपित्तास्रनुत्।। (R.R.S. 3/102)

Rasa: Kashaya, Madhura
Guna: Snigdha, Shita
Virya: Shita
Vipaka: Madhura
Dosha: Tridoshahara
Therapeutic Indications: Vamana, Hikka, Netra Roga, Visha Roga.

4. Pushpanjana

पुष्पाञ्जनं तु शिशिरं स्निग्धं पित्तप्रणाशनम्।
अभिष्यन्दप्रशमनं परं दाहविनाशनम्।।51।।
विचर्चिकादित्वग्दोषशमनं व्रणरोपणम्।
समाख्यातं विशेषेण हिक्कापञ्चकनाशनम्।। (R.T. 22/51-52)
पुष्पाञ्जनं सितं स्निग्धं हिमं सर्वाक्षिरोगनुत्।
अतिदुर्धरहिध्माघ्नं विषज्वरगदापहम्।। (R.R.S. 3/103)

Rasa: Kshariya
Guna: Snigdha, Shita
Virya: Shita
Dosha: Tridoshahara
Karma: Netraya, Vishaghana, Jvaraghana.
Therapeutic Indications: Hikka, Jvara, Visha, Netra Roga.

5. Nilanjana

नीलाञ्जनं गुरु स्निग्धं नेत्र्यं दोषत्रयापहम्।
रसायनं सुवर्णघ्नं लोहमार्दवकारकम्।। (R.R.S. 3/104)

Guna: Snigdha, Guru
Virya: Shita
Dosha: Tridoshahara
Karma: Rasayana, Dhatumridukara, Suravana Maraka.
Therapeutic Indications: Netra Roga, Dhatu Maraka

Probable Physico-Chemical Changes

The Shodhana Process is a specialized procedure used to purify and potentiate metals, minerals, and certain other substances to make them bioavailable and safe for medicinal use. During this process, physico-chemical changes occur, significantly altering the properties of the material.

1. General Observations during Shodhana

a. Physical Changes

1. **Size Reduction**: Continuous Bhavana (triturating with juice) and Svedana (steam boiling) lead to the reduction of particle size, converting coarse particles into finer ones (nanoparticles in some cases).
2. **Phase Changes**: Exposure to heat and liquids during Marana can induce phase transitions (e.g., crystalline to amorphous forms).
3. **Drying Effects**: Sun-drying or heat treatment removes moisture, stabilizing the product and ensuring long-term preservation.

b. Chemical Changes

1. **Oxidation-Reduction Reactions**: Interaction with herbal liquids (like Bhringaraja Siarasa, Triphala Kiatha) or acidic media (like lemon juice) may lead to oxidation or reduction of metallic or mineral components.
2. **Chelation**: Bioactive compounds in juices or decoctions may chelate metals, altering their structure and bioavailability.

Formation of Complex Compounds: Repeated Bhavana enhances the incorporation of organic and inorganic molecules, forming stable complexes.

pH Adjustment: Acidic or alkaline mediums adjust the pH, helping to dissolve impurities and neutralize toxic components.

2. Specific Anjana and Their Changes

a. Sauviranjana and Sroto-Anjana

1. **Steam Treatment (Svedana)**
   Dissolves water-soluble impurities in the Triphala Kvatha or Bhringaraja Svarasa.
   Facilitates the removal of heavy metals or toxic residues through hydrolysis.
   Promotes uniform hydration of particles, improving their softness and homogenization.
2. **Drying**: Drives off volatile impurities and locks in medicinal properties from the decoction.
3. **Resultant Material**: Cleaner, softer, and more bioavailable form of Anjana.

Enhanced therapeutic efficacy for eye disorders.

b. Nilanjana

1. **Bhavana with Lemon Juice**:
   Citric acid in lemon acts as a chelating agent, binding to toxic metals or impurities.
   Promotes the decomposition of undesirable oxides and stabilizes desired mineral forms.
2. **Sun-Drying**: Induces further phase stabilization, locking in the medicinal properties.
   Potentially enhances the bioavailability of active compounds via solar energy infusion (Surya Kalpana).
3. **Resultant Material**: Fine, bioactive powder suitable for therapeutic use.
   Removal of impurities like arsenic or lead traces that may exist in raw materials.

Yoga

1. **Sauviranjana**: Timiraharanjana, Shighraprabhava Rasa
2. **Rasanjana**: Pushyanuga Churna, Ashoka Ghrita, Piyusavalli Rasa.
3. **Srotoanjana**: Rasendramangala Rasa, Chandabhairava Rasa.
4. **Pushpanjana**: Churananjana.
5. **Nilanjana**: Vatari Rasa, Amritarnava Rasa, Timiraharanjana.

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review on Chakshushya Varga & Anjana As Cosmeceuticals	Rajitha S, PG Scholar, Department of Dravyaguna, Karnataka Ayurveda Medical College, Mangaluru, Karnataka.	Chakshushya drugs are particularly effective in restoring balance to the doshas within ophthalmic tissues. The Chakradutta text details the Chakshushya Varga, which includes herbs like Triphala, Goghrita, Yava, Madhu, Shatavari, and Mudga, as well as the practice of Padabhyanga as part of a daily regimen. This underscores the importance of following Swasthavritta Charya and incorporating Chakshushya drugs for maintaining optimal health and vision.

Kankushtha

Introduction

- Kankushtha is recognized as the eighth mineral drug in the uparasa group and remains a subject of significant debate.
- Various classical texts have presented differing perspectives, contributing to the long-standing controversy surrounding the drug.
- If kankushtha is identified as Rhubarb, the following details apply: Rhubarb refers to a group of plants belonging to the genus Rheum in the family Polygonaceae.

- These are herbaceous, perennial plants that grow from short, thick rhizomes.

Synonyms

Kalakankushtha, Kolabaluka, Talakushtha, Tikshnadugdhika, Rangadayaka, Rechaka, Varanga, Viranga, Svarnakshiri Niryasa and Hemavati.

Sources

- Currently, kankushtha refers to the gum exudate of the well-known herbal drug Mysore gambose tree (Garcinia morella).
- This exudate has a reddish-yellow color and turns into a powder when dried.
- It is primarily imported from Singapore, Malaysia, Myanmar, Indonesia, and other regions.

Types

तत्रैकं नालिकाख्यं हि तदन्यदेणुकं मतम्।
पीतप्रभं गुरु स्निग्धं श्रेष्ठं कङ्कुष्ठमादिमम्।
श्यामपीतं लघु त्यक्तसत्त्वं नेष्टं हि रेणुकम्।।
(R.R.S. 3/109-110)

Nalika Kankushtha: Pitta Varna, Guru, Snigdha
Renuka Kunkushtha: Krishna- Pitta Varna, Laghu.

Grahya Lakshana

पीतप्रभं गुरु स्निग्धं श्रेष्ठं कङ्कुष्ठमादिमम्। (R.R.S. 3/110)
1. Yellow in colour
2. Heavy

Agrahyata Lakshana

श्यामपीतं लघु त्यक्तसत्त्वं नेष्टं हि रेणुकम्। (R.R.S. 3/110)
1. Blackish Yellow Colour
2. Light

Shodhana

कङ्कुष्ठं शुद्धिमायाति त्रिधा शुण्ठ्यम्बुभावितम्।
सत्त्वाकर्षोऽस्य न प्रोक्तो यस्मात्सत्त्वमयं हि तत्।।
(R.R.S. 3/114)

1. Place Nalika kankushtha in a clean khalva yantra (mortar).
2. Perform three bhavanas by triturating the drug with nimbu svarasa (lemon juice).
3. After the third bhavana, dry the substance thoroughly.
4. Store the purified drug in an airtight container labelled as shuddha kankushtha.

Note: As mentioned in the verse, sattvapatana is not required because kankushtha naturally exists in the form of its essence (sattva).

Dose

भजेदेनं विरेकार्थं ग्राहिभिर्यवमात्रया।
नाशयेदामजार्त्तिं च विरेच्य क्षणमात्रतः।। (R.R.S. 3/115)
भक्षितः सह ताम्बूलैर्विरिच्यासून्विनाशयेत्। (R.R.S. 3/116)

Virechana Karma: 1 Yava (30 mg)
Anupana: Tambula Patra, Jiraka, Shunthi Churna.

Dosha

Excessive use of Shuddha Kankushtha can result in severe Virechana, potentially causing death due to dehydration.

Management

बर्बूरीमूलिकाक्वाथो जीरसौभाग्यकं समम्।
कङ्कुष्ठविषनाशाय भूयो भूयः पिबेन्नरः।। (R.R.S. 3/117)
Babbula Mula Kvatha is consumed with Jiraka Churna and Tankana Churna.

Properties

कङ्कुष्ठं तिक्तकटुकं वीर्योष्णं चातिरेचनम्।
व्रणोदावर्त्तशूलार्त्तिगुल्मप्लीहगुदार्त्तिनुत्।। (R.R.S. 3/113)
नाशयेदामवातं च रेचयेत् क्षणमात्रतः।
कङ्कुष्ठं नाशयेत् शीघ्रं कठोदरजलोदरम्।।
(R.J.Ni. Ch.2, p.208)

Rasa: Tikta, Katu, Amla
Guna: Ushna, Tikshna
Virya: Ushna
Karma: Rechana, Atyanta.
Therapeutic Indications: Vrana, Udavarta, Shula, Gulma, Arsha, Amavata.

Probable Physico-Chemical Changes

During Shodhana Process

1. Physical Changes

- **Size Reduction**: Bhavana reduces particle size, enhancing bioavailability and medicinal efficacy.
- **Impurity Removal**: Mechanical trituration eliminates external impurities like dust and fibrous residues.
- **Improved Dispersion**: Lemon juice ensures better integration of active compounds, improving uniformity.

2. Chemical Changes

- **Acid-Mediated Detoxification**: Citric acid neutralizes toxins, dissolves water-soluble impurities, and promotes hydrolysis for improved potency.
- **pH Adjustment**: Acidic medium breaks down unwanted alkaline elements and stabilizes bioactive compounds.
- **Enrichment & Stabilization**: Lemon juice flavonoids bind with Kankushtha's constituents, enhancing therapeutic value and shelf life.

Yoga

1. Dhanvantari rasa
2. Dhanvantari ghrita
3. Shotodarari rasa
4. Udavartahara rasa
5. Mritasanjivani rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Kankustha: A Controversial Drug	Kotrannavar Vijaykumar S. Dept of Rasashastra, K.L.E. University's Shri B.M.K. Ayurveda Mahavidyalaya Post Graduate Studies and Research Centre, Shahapur, Belgaum, Karnataka.	This study concludes that the resin obtained from the bark of the Mysore Gambose tree (Garcinia morella) is Kankustha, based on its appearance, physical properties, varieties, and actions. Furthermore, according to the standard nomenclature of Ayurvedic medicinal plants established by CCRA and S, New Delhi, in 1999, Garcinia morella Desr is recognized as Kankustha.

Agnijara

Introduction

- Agnijara is classified under Sadharana Rasa Varga due to its role in mercury processing techniques.
- Commonly known as Grey Amber, Agnijara is recognized as Ambergris in English.
- This unique substance is solid, waxy, and flammable, typically appearing in a dull grey or blackish hue.
- It is a natural secretion produced in the digestive system of sperm whales (Physeter macrocephalus).
- When fresh, ambergris emits a marine and fecal odor that matures into a sweet, earthy aroma over time.
- Once prized as a fixative in the perfume industry, it has largely been replaced by synthetic alternatives.
- Its earliest mention is found in the Rasarnava for use in Abhraka dravana (mica processing), with further elaboration in Rasashastra texts.

Synonyms

Agnija, Agnigarbha, Agniniryasa, Agnijvala, Valavagnimala, Vahnijara, Samudrajarayu, Sindhuphala and Arnavodbhava.

Sources

- Ambergris originates as a biliary secretion within the intestines of sperm whales.
- It is commonly discovered floating on the sea or embedded in coastal sands.
- Occasionally, ambergris is also found within the abdominal cavity of whales.
- The presence of giant squid beaks embedded in ambergris lumps suggests that sperm whales produce this substance in their gastrointestinal tracts to facilitate the passage of hard or sharp objects ingested during feeding.
- Most ambergris is expelled as part of the whale's fecal matter.
- If the lump grows too large to pass through the intestines, it may be ejected orally, contributing to the misconception that ambergris originates from whale vomit.

Shodhana

यदब्धिक्षारसंशुद्धस्तस्माच्छुद्धिर्न हीष्यते। (R.R.S. 3/135)

1. Acquire Agnijara from reputable and trusted sources, ensuring it has been naturally collected from marine environments with adequate exposure to alkaline seawater and sunlight.
2. Carefully examine the Agnijara for any external impurities, such as sand, debris, or other contaminants.
3. Remove any visible impurities manually to maintain its quality.
4. Confirm that the Agnijara has undergone sufficient exposure to alkaline seawater and the

drying effects of sunlight, which contribute to its natural self-purification process.

5. Once verified, the naturally purified Agnijara can be directly utilized in formulations or procedures without requiring additional purification steps.
6. This method ensures the use of Agnijara in its most natural and efficacious form, relying on its inherent purification mechanisms.

Marana

Not Mentioned.

Dose

1/4th – ½ ratti (31 to 62 mgs)

Anupana

Honey, Ghee, Butter

Properties

स्यादग्निजार: कटुकोष्णवीर्य: तुन्दामयघ्न: कफवातहारी।
पित्त: प्रद: शोणितसन्निपातशूलादिवातामयनाशकच।।

(An.Kan.Kri. 1/233)

अग्निजारस्त्रिदोषघ्नो धनुर्वातादिवातनुत्।
वर्द्धनो रसवीर्यस्य दीपनो जारणस्तथा।। (R.R.S. 3/136)

अग्निजारूरिति ख्यातं स्पर्शवेधी भवेद्रस:। (Rasopanishat)

Rasa: Katu

Guna: Ushna, Laghu

Vipaka: Katu

Virya: Ushna

Dosha: Tridoshaghna

Karma: Deepana, Pachana, Hridaya, Balya, Parada Dipana, Jarana

Therapeutic Indications: Shula, Grahi, Pratikshya, Pakshaghata, Rakta Roga.

Probable Physico-Chemical Changes

During Shodhana Process

1. Removal of Physical Impurities

a. Observation: Visible impurities like sand, debris, and organic matter are removed.

b. Impact: Physical purity increases, ensuring uniformity in texture and composition.

c. Physicochemical Changes

Reduction in external contaminants.

Improved homogeneity of the material.

2. Effect of Alkaline Seawater Exposure

a. Observation: Prolonged contact with seawater promotes chemical interactions.

b. Impact: Natural ion exchange processes may modify its composition.

c. Physicochemical Changes

1. Neutralization of acidic components: Seawater alkalinity can neutralize acidic impurities.

2. Ion incorporation: Trace elements like sodium, magnesium, and calcium may integrate into Agnijara's structure, enhancing its mineral content.

3. Impact of Sunlight (Photochemical Reactions)

a. Observation: Exposure to sunlight induces dehydration and promotes photochemical reactions.

b. Impact: The material becomes more stable and refined.

c. Physicochemical Changes

- Loss of moisture content reduces microbial activity and prevents decomposition.
- Photochemical changes may alter organic compounds, leading to the breakdown of unwanted residues.
- Enhanced oxidative reactions stabilize the material's inherent properties.

4. Self-Purification Mechanisms

a. Observation: Agnijara exhibits self-purification properties due to its interaction with environmental factors.

b. Impact: Its inherent efficacy and compatibility for use in formulations improve.

c. Physicochemical Changes

Reduction of volatile or reactive impurities.

Crystallization or stabilization of active components.

Yoga

1. Chintamani rasa
2. Brihat vata Chintamani Rasa
3. Dhatri Rasayana
4. Vadavanala rasa
5. Jaharamohara vati

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Agnijar (Ambergris): A Review Study of An Animal Product W.S.r. In Ayurved Medicines	Dr. Snehdeep Soni, PG Scholar Department of Rasashastra and Bhaishajya Kalpana, M.M.M. Govt. Ayurved College, Udaipur (Raj,).	Agnijara is recognized for its tridosha-shamak properties, particularly in balancing Kapha and Vata doshas. Its therapeutic benefits make it popular among Ayurvedic practitioners for treating conditions like Dhanurvata (tetany), Prameha (diabetes), and Hridaya Roga (heart diseases). Additionally, Agnijara is used as Kshara Vishesh, and plays a vital role in Parad Bandhan Karma and Parad Jarana Karma for mercury purification, as well as in the Abhraka Druti Prakaran method for melting Abhraka.

Giri Sindura (Red oxide of Hg)

Introduction

- Girisindura, the sixth mineral drug of the Sadharana Rasa group, is chemically identified as Mercuric Oxide (HgO).
- It is a red or orange-colored, dry mercuric powder naturally found on specific mountain peaks.
- Solid at room temperature and decomposes above 500°C, releasing toxic mercury fumes and oxygen.
- Absorbed through inhalation, ingestion, or skin contact; affects kidneys and irritates eyes, skin, and the respiratory tract.
- Reacts violently with reducing agents, chlorine, hydrogen peroxide, and magnesium when heated.
- Bioaccumulates in aquatic organisms, posing risks to the food chain.

Synonyms

सिन्दूरं गिरिसिन्दूरं महिलाभालभूषणम्।
गणेशभूषणञ्चैव तथा शृङ्गारभूषणम्।।
नागजं नागगर्भञ्च तथैव नागरेणुकम्।
मङ्गल्यं भालसौभाग्यं तदेव परिकीर्तितम्।। (R.T. 21/148-149)

Sindura, Girisindura, Mahila-Bhala-Bhushana, Shringara-Bhushana, Nagaja, Nagagarbha, Nagarenuka, Mangalya, and Bhalasaubhagya.

Minerological Identification

Properties	Identification
Chemical Name	Red Oxide of Mercury
Chemical Composition	HgO
Colour	Deep Red, Brownish Red
Cleavage	Perfect
Luster	Viterous
Streak	Reddish orange
Specific Gravity	11.23

Properties	Identification
Hardness	1.5- 2
Fracture	Sectile
Tenacity	Sectile
Transparency	Transparent to Translucent

Sources

- Girisindura is a red or orange-colored dry mercuric powder naturally occurring on select mountain peaks.
- When artificially synthesized, this substance is referred to as Nagasindura.
- Though both share similarities in appearance, their origin distinguishes Girisindura as naturally sourced and Nagasindura as man-made.

Types

According to Rasa Jala Nidhi: 2 types

1. Natural- Giri Sindura
2. Artifical- Naga Sindura

Grahya Lakshana

अतिसूक्ष्मकणं स्निग्धं गुरु वर्णसमुज्ज्वलम्।
मृदुलं विमलञ्चैव सिन्दूरं जात्यमुच्यते।। (R.T. 21/50)

1. Girisindura is distinguished by its fine particulate form, displaying a vibrant red or orange coloration.
2. The powder is smooth (snigdha), soft to the touch, and free from impurities.
3. Its inherent heaviness (guru) reflects its purity and high density.
4. A glossy or shiny appearance is a key indicator of its quality and suitability.
5. Only those samples that meet these stringent criteria are considered appropriate for use in pharmaceutical preparations.

Shodhana

Not Mentioned

Marana

Not Mentioned

Dose

Only for external application.

Anupana

Not Applicable

Properties

त्रिदोषशमनं भेदि रसबन्धनमग्निमम्।
देहलोहकरं नेत्र्यं गिरिसिन्दूरमीरितम्।। (R.R.S. 3/138)
सिन्दूरं क्षुद्कुष्ठघ्नं त्वच्यं व्रणविशोधनम्।
भग्नसन्धानजननं तथैव व्रणरोपणम्।।
पामाविचर्चिकासिध्मवीसर्पशमनं परम्।
भूतघ्नञ्च विशेषेण रक्तदोषनिषूदनम्।। (R.T. 21/151-152)

Rasa: Katu Tikta
Guna: Ushna
Virya: Ushna
Dosha: Tridosha Shamaka
Karma: Rasa Bhandakara, Agnikarma, Netrya, Twachya.
Therapeutic Indications: Kushtha, Pama, Vicharchika, Vrana Vishodhana, Vrana Ropana, Kandu, Sidhma,

Yoga

1. Sinduradya malahara
2. Sinduradya taila

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review Study on Girisindhura	Poorvi Priscilla A., Final Year Post Graduate Scholar, Department of Rasashastra and Bhaishaja Kalpana, Government Ayurveda Medical College, Bengaluru, Karnataka, India.	Girisindhura belongs to the Sadharana Rasa group and comes in two forms: natural (HgO) and artificial (PbO), known as Nagasindhura. Due to its toxicity, it requires purification for safe external use, as internal administration and processes like Marana and Satvapatana are not mentioned in Rasa classics. Girisindhura possesses properties such as Lekhana (scraping), Chakshushya (vision enhancement), Krimighna (antimicrobial), Kandughna (itch relief), and Twakdoshahara (skin health). Both Girisindhura and Nagasindhura are recognized for their astringent and metallic qualities, useful in Rasa Bandhana practices.

Mriddara Shringa (Litharge)

Introduction

- Mriddarashriga, the eighth mineral drug in the Sadharana Rasa category, is identified as litharge in English, chemically known as lead monoxide (PbO).
- It is a yellow-hued mineral form of lead oxide with a tetragonal crystal structure, dimorphous with massicot. Historically, "litharge" has been associated with similar substances, such as red or white lead.
- Introduced in the Rasashastra period (8th–9th century), it is vital in mercury-processing techniques.
- While effective pharmaceutically, lead oxide is hazardous, causing toxicity to humans and the environment, affecting tissues, organs, and ecosystems through bioaccumulation.

Synonyms

मुद्दारशृङ्गकञ्चैव मतं वोदारशृङ्गकम्।
मुर्दाशङ्ख तथा मुद्रशङ्खकञ्च निगद्यते।। (R.T. 21/165)

Meddarashtiga, Bodarashriga, Murdasankha and Murdashankhaka.

Minerological Identification

Properties	Identification
Chemical Name	Lead Oxide
Chemical Composition	PbO
Colour	Yellow
Cleavage	Good
Luster	Greasy to dull
Streak	Yellow
Specific Gravity	9.5 – 9.6
Hardness	2
Fracture	Uneven
Transparency	Transparent

Sources

According to classical references, Mrdda-rasriga was historically sourced from regions like Gujarat and Mount Abu. However, in modern times, it is no longer found within India. Instead, it is primarily imported from countries such as Myanmar and China.

Types

1. Two types based on origin

1. Khanija (Natural)
2. Kritrima (Artificial)

2. Two types based on colour

बोदारशृङ्गकं प्रोक्तं द्विविधं पीतपाण्डुरम्।
सदलं निर्दलं तस्य जनिर्गुर्जरमण्डले।।
अर्बुदाख्यगिरेः पार्श्वे सीससत्त्वं स्मृतं परम्।
(Ay.Pra. 2/343-344)

Sr. No.	Type	Colour
1.	Pita Mriddarashringa	Yellowish
2.	Pandura Mriddarashringa	Pale White

3. Two types based on Structure

मृद्दारशृङ्गं पीताभं सदलं निर्दलं तथा।
सीसगर्भं खरस्पर्शं गुरु चैव प्रकीर्तितम्।। (R.T. 21/166)

Sr. No.	Type	Charaterstics
1.	Sadala Pitta Mriddarashringa	Yellowish, Luster and rough surface
2.	Nirdala Pitta Mriddarashringa	Without Layers

Grahya Lakshna

सदलं पीतवर्णं च भवेद्गुर्जरमण्डले। (R.R.S. 3/145)
मृद्दारशृङ्गं पीताभं सदलं निर्दलं तथा।
सीसगर्भं खरस्पर्शं गुरु चैव प्रकीर्तितम्।। (R.T. 21/166)

1. Exhibits a distinctive yellow hue.
2. May occur with or without visible layers.
3. Possesses a rough surface to the touch.
4. Notably heavy, indicative of its purity.

Shodhana

मृद्दारशृङ्गमानीय कुट्टयेत् खल्वमध्यगम्।
प्रस्तरांशं परित्यज्य पेषयेदतियत्नतः।।
वस्त्रपूतं ततः कृत्वा पुनः सुविमलाम्भसा।
पेषयेत्पक्षमेकं तु ततो घर्मे विशोषयेत्।।
मृद्दारशृङ्गकं काममेतद्विधिविशोधितम्।
क्षतेऽवचूर्णनाद्यर्थं युञ्जीत भिषजां वरः।। (R.T. 21/167-169)

1. Collect pieces of Mriddarashringa and place them in a khalva yantra (mortar and pestle).
2. Roughly pound the pieces to break them into smaller fragments.
3. Manually separate and remove physical impurities such as stones and gravel from the pounded material.
4. Thoroughly triturate the cleaned fragments in the khalva yantra to form a fine powder.
5. Filter the powdered substance through a clean cloth to obtain a uniform and refined filtrate.
6. Transfer the fine powder into a clean khalva yantra.
7. Add the required amount of clean water and triturate the mixture continuously for 15 days.
8. Spread the triturated powder under sunlight to dry completely.
9. Store the dried, purified Mriddarashringa in an airtight container to maintain its quality.
10. This processed fine powder, referred to as Shuddha Mriddarashringa, is highly effective as a dusting agent for treating various types of wounds.

Marana

Not Mentioned.

Dose

External Used only

Anupana

Not Applicable

Properties

मृद्दारशृङ्गं शिशिरं परं वातकफापहम्।
फिरङ्गव्रणहृत् केश्यं व्रणरोपणमुत्तमम्।।
भग्नसन्धानजननं पामाकण्डूतिकादिनुत्।
सङ्कोचकं विशेषेण त्वग्दोषशमनं मतम्।। (R.T. 21/170-171)

Guna: Guru, Shita
Virya: Shita
Dosha: Vata-kaphahara
Karma: Keshya, Rasabandakara, Baghan Sandhanakara.
Therapeutic Indications: Phiranga, Varna Ropana, Pama, Kandu, Sankocha, Tvakaroga.

Probable Physico-Chemical Changes

During Shodhana Process

Physical Changes

a. **Pounding and Fragmentation**: Reduces particle size, removes impurities, and improves homogeneity.
b. **Manual Impurity Removal**: Enhances purity by separating stones and gravel, reducing bulk weight.
c. **Trituration into Fine Powder**: Improves surface area, bioavailability, and uniform distribution.

d. Filtration: Separates larger unwanted particles, ensuring a refined texture.

e. Sunlight Drying: Dehydrates the material, reducing moisture content and stabilizing it for prolonged shelf life.

Chemical Changes

a. Trituration with Water (Bhavana Samskara): Facilitates partial dissolution of impurities, enhances bioavailability, and integrates water-soluble components.

b. Sunlight Exposure: Promotes photochemical reactions, stabilizing and enhancing mineral properties.

c. Formation of Shuddha Mriddarashringa: Produces a stable, antimicrobial powder with increased surface area for therapeutic applications.

Yoga

1. Mriddarashringadya Malahara.

Research Updates

No Data Found

Kamsya (Bronze)

Introduction

- Kamsya, or bronze, is a metal alloy primarily composed of tamra (copper) and vanga (tin).
- The traditional ratio for alloying is four parts Shuddha Tamra to one part Shuddha vanga.
- References to kamsya for medicinal use date back to the Samhita Kala and are mentioned in texts like the Charaka Samhita.
- Its significance continued to grow during the evolution of Rasashastra, where its toxicology and therapeutic applications were extensively studied.
- Copper and tin are melted together in a crucible over intense heat.
- The molten mixture is carefully poured into molds, cooled, solidified, and stored as kamsya for pharmaceutical use.
- Bronze is a hard and brittle alloy, notable for its durability and reduced brittleness compared to iron.
- It oxidizes superficially, forming a protective copper oxide or copper carbonate layer, preventing further corrosion.
- In rare cases, bronze can suffer from "bronze disease," a destructive corrosion caused by copper chlorides.

Synonyms

कंसीयं कांस्यक कांस्यं घोषपुष्पञ्च घोषकम्।
घोषो घोषं वह्निलोहं तदेव परिकीर्तितम्।। (R.T. 22/21)

Kamsiya, Kaisyaka, Kamsya, Ghoshapushpa, Ghoshaka, Ghosho, Ghosham and Vahniloha.

Sources

अष्टभागेन ताम्रेण द्विभागखुरकेण च।
विदुतेन भवेत्कांस्यं तत्सौराष्ट्रभवं शुभम्।। (R.R.S. 5/205)

- Kamsya, a traditional alloy, is formed by melting eight parts of tamra (copper) with two parts of khuraka vanga (tin).
- This precise combination yields a durable and versatile alloy.
- The Kamsya produced in the Saurashtra region is renowned for its superior quality and is highly regarded in traditional practices.
- Often referred to as bell metal or white copper, this alloy is celebrated for its distinct properties and widespread applications.

Types

कांस्यं च द्विविधं प्रोक्तं पुष्पतैलिकभेदतः।
तत्र तैलिकं पुष्पश्वेततमं कपिशप्रभम्।। (Ay.Pra. 4/65)

1. Pushpa- Shveta Varna
2. Tailika- Kapisha Varna

Grahya Lakshana

सुनादं भास्वरं स्निग्धं श्वेतं मृदु च निर्मलम्।
घनाग्निसहमत्यन्तं कांस्यं ग्राह्यमिहोच्यते।। (R.T. 22/24)

1. Produces a clear, resonant sound when struck against a hard surface.
2. Exhibits a shiny, smooth (snigdha), and whitish coloration.
3. Soft and pleasant to touch, indicating its refined quality.
4. Capable of withstanding heavy hammer blows without cracking or breaking.
5. Resilient under high-intensity heat, ensuring stability during processing.

Agrahyata Lakshana

निरुज्ज्वलं खरं रूक्षं पीतं दहनतापितम्।
आताम्रं मन्दनादञ्च कांस्यं हेयमुदीरितम्।। (R.T. 22/25)

1. Lacks luster and has a rough, uneven surface.
2. Feels dry and coarse to the touch, indicating poor quality.
3. Displays a yellowish coloration rather than the desired whitish tone.
4. Turns copper-colored when exposed to high heat, deviating from standard properties.
5. Produces a dull, non-resonant sound when struck against a hard surface.

Shodhana

a. Method 01

तनुपत्रीकृतं कांस्यं वह्निसन्तापितं भृशम्।
निर्वापितं गव्यमूत्रे सप्तधा शुद्धिमाप्नुयात्।। (R.T. 22/26)
तप्तं कांस्यं गवां मूत्रे वापितं परिशुद्ध्यति।। (R.R.S. 5/210)

1. Take thin foils of kamsya (bronze) for the purification process.
2. Heat the kamsya foils until they become red hot.
3. Immediately immerse the heated foils into a vessel containing fresh gomutra (cow urine).
4. Repeat the heating and dipping process seven times to ensure thorough purification.
5. After completing the cycles, dry the foils properly.
6. Store the purified kamsya in a clean, airtight container for pharmaceutical use.

b. Method 02

सूक्ष्मपत्रीकृतं घोषपुष्पाह्वयं मूत्रपट्वन्वितं स्थालिकायां न्यसेत्।
यामसंपाचितं तीक्ष्णतीक्ष्णाग्निना सर्वदोषोज्झितं जायते सत्त्वरम्।। (R.T. 22/27)

1. Place thin foils of pittala (brass) into a clean vessel of appropriate size.
2. Add enough gomutra (cow urine) and saindhava lavana (rock salt) to completely submerge the foils.
3. Place the vessel over a fire and cook the mixture for one prahara (approximately 3 hours).
4. Allow the vessel to cool naturally.
5. Remove the foils, wash them thoroughly with clean water, and dry them under the sun.
6. Store the purified Shuddha kamsya in a suitable airtight container for pharmaceutical applications.
7. This purification method effectively removes all impurities (doshas) from kamsya, ensuring its quality and safety for medicinal use.

Marana

a. Method 01

तनुपत्रीकृतं कांस्यं समगन्धसमन्वितम्।
अर्कक्षीरेण सम्पेष्य शोषयेदातपे दृढम्।।
सम्पुटस्थं ततः कृत्वा वारणाख्ये पुटे पुटेत्।
एवं पुटत्रयात्कांस्यभस्म स्यात्सुमनोहरम्।। (R.T. 22/28-29)

1. Cut thin foils of Shuddha Kamsya into small pieces and mix with an equal quantity of Shuddha Gandhaka in a clean khalva yantra.
2. Triturate the mixture thoroughly with arka dugdha until homogeneous.
3. Sun-dry the triturated mixture until moisture-free.
4. Enclose the dried powder in a Sharava samputa and subject it to one gajaputa (controlled heating).
5. Repeat the trituration, drying, and heating process two more times.
6. Store the final Kamsya bhasma in airtight containers for pharmaceutical use.

b. Method 02

कांस्यं तुल्यं शिलागन्धयुतं कन्याम्बुपेषितम्।
पुटेत् त्रिधैवं यत्नेन भस्म स्यात् कज्जलप्रभम्।। (R.T. 22/31)

1. Cut thin foils of shuddha kamsya (1 part) into small pieces.
2. Add equal quantities of shuddha manahshila and shuddha gandhaka.
3. Place the mixture in a clean khalva yantra (mortar and pestle).
4. Triturate thoroughly by gradually adding the required quantity of arka dugdha until a homogeneous paste is formed.
5. Enclose the paste in a sharava samputa (sealed earthen or ceramic container).
6. Subject the sealed container to one cycle of gajaputa (controlled heating).
7. Repeat the process of trituration, drying, and heating two more times.

8. The final product is a black, kajjali-like kamsya bhasma.
9. Store the prepared kamsya bhasma in airtight containers to preserve its pharmaceutical and therapeutic properties.

Dose

कांस्यकस्य प्रयोगस्तु रविलोहसमो मतः।
गुञ्जार्द्धतश्च गुञ्जकमिता मात्रा प्रयुज्यते।। (R.T. 22/34)

Dose: ½ - 1 ratti (62 mgs - 125 mgs).

Anupana

Honey or any other suitable adjuvant depending on disease condition.

Properties

घोषपुष्पं तु तुवरं तिक्तोष्णं लेखने हितम्।
नेत्रप्रसादनं रूक्षं सरं च विशदं परम्।।
कृमिघ्नं कुष्ठशमनं कफपित्तप्रणाशनम्।
वातघ्नं दीपनञ्चैव परमेतत्प्रकीर्तितम्।। (R.T. 22/32-33)

Rasa: Kashaya, Tikta
Virya: Ushna
Guna: Ruksha, Visada, Sara
Dosha: Tridoshaghana
Karma: Lekhana, Dipana, Netra Prasadana
Therapeutic Indications: Kushtha

Probable Physico-Chemical Changes

During Shodhana Process

1. Heating and Quenching in Gomutra

- Expansion and contraction from heating and rapid cooling break impurities and loosen oxides.
- Gomutra dissolves dirt and oxides due to its acidic and alkaline nature.
- Repeated cycles improve the metal's mechanical properties.
- Bioactive compounds in gomutra neutralize toxins and remove residues.
- Leaves trace organic residues, enhancing therapeutic compatibility.

2. Heating in Gomutra and Saindhava Lavana

- Salt in gomutra enhances ionic activity, promoting impurity removal.
- Extended heating breaks down volatile impurities.
- Detoxifies the material by removing harmful elements like lead or arsenic.
- Prolonged heating refines and strengthens the metal.
- Infuses medicinal properties from gomutra and salt into the metal.

During Marana Process

1. Physical Changes

- **Foils to Fine Powder**: Shuddha Kamsya foils triturated with Gandhaka (sulfur) and mediums like Arka Dugdha form a fine powder, increasing surface area.
- **Color Change**: Progresses from darkened mixtures after the first Gajaputa to uniform, ash-like (Kajjali-like) by the third cycle.
- **Loss of Metallic Luster**: Metallic sheen diminishes, leaving a soft, non-shiny powder.
- **Texture**: Final product is fine and lightweight, indicating complete calcination and oxidation.

2. Chemical Changes

- **Oxidation**: Metals form oxides (CuO, Cu_2O, SnO_2), making them bio-compatible.
- **Sulfide Formation**: Sulfur reacts with metals to form stable sulfides (CuS, SnS_2) crucial for therapeutic effects.
- **Organic Decomposition**: Components from Arka Dugdha decompose, leaving carbon residues enhancing medicinal potency.
- **Toxicity Reduction**: Impurities like unreacted tin or lead are neutralized during heating cycles.

Yoga

1. Makaradhvaja rasa
2. Lakshmivilasa rasa
3. Vatavidhvamsaka rasa
4. Nityananda rasa
5. Kshayakesari rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Brief Review of Kamsya (Bronze) Through Ayurvedic Literature	Dr. Arundhati Shirke, PG Scholar Dept. of Rasashastrae vam Bhaishajya Kalpana, Bharati Vidyapeeth College of Ayurved, Pune, M.S.	Dhatu Bhasma plays a vital role in sustaining life, supporting bodily functions, and acting as a Rasayana to delay aging. It is also used in treating conditions like Granthi and Arbuda (growths and tumors). Studies show that these Bhasmas exist in nanoparticle form, potentially influencing genetic structures and correcting DNA mutations that cause protein synthesis disruptions, thereby aiding tissue recovery. Kamsya, a blend of Tamra (copper) and Vanga (tin) in a 4:1 ratio, is categorized under Mishra Dhatuvarga. Its therapeutic applications, particularly in treating Kapha and Meda-related disorders, highlight its significance in Ayurvedic medicine. Further research is needed to explore its unique properties and therapeutic potential.
2.	A review on Kansya: The bell metal	Dr. Jambla Neha Post Graduate Scholar, Department of Rasa Shastra, PG School of Ayurveda & Research, Desh Bhagat University, Mandi Gobindgarh, Punjab, India	Kansya, a significant Misra Loha (alloy of copper and tin), has been recognized since the Samhita period. Charaka mentioned its use in preparing Vasti Netra. Known as Bell Metal or Bronze, it is a hard alloy primarily composed of copper and tin, typically in a 4:1 ratio (e.g., 78% copper and 22% tin). Kansya Bhasma, derived from this bell metal ore, is an Ayurvedic medicinal preparation used to treat conditions like intestinal worms, skin diseases with dry, hardened skin, and eye issues. However, it is typically combined with adjuvants for effective results. Ayurveda texts recognize two varieties of Kansya: Pushpa and Tailika, with only the former used therapeutically.

Pittala (Brass)

Introduction

- Pittala, or brass, is an alloy composed of tamra (copper) and yashada (zinc).
- References to its medicinal use date back to Samhitakala and are mentioned in texts like Charaka Samhita.
- With the rise of Rasashastra, brass was studied extensively for its therapeutic applications and toxic effects.
- To prepare brass, two parts shuddha tamra and one part shuddha yashada are melted together in a gara musha.
- Brass is highly malleable and has a low melting point (900–940°C), making it versatile for casting and allowing properties to be adjusted by altering its composition.

Synonyms

पित्तलं पीतलोहञ्च कपिलोहञ्च रीतिका।
आरं तथारकूटञ्च तदेव परिकीर्तितम्।। (R.T. 22/1)

Pittala, Pitaloha, Kapiloha, Ritika, Ara and Arakutapittala.

Minerological Identification

Properties	Identification
Chemical Name	Coper, Zinc/Brass
Chemical Composition	Cu_1Zn_3

Properties	Identification
Colour	Yellow to Brassy Yellow
Cleavage	None
Luster	Metallic
Streak	Golden Yellow
Specific Gravity	8.4- 8.7
Hardness	3
Fracture	Uneven
Transparency	Opaque
Melting Point	930 Degree C
Boiling Point	1100 Degree C

Sources

Brass is an alloy of copper and zinc, with high-grade production primarily based in Drunen, Netherlands, the sole active facility for such alloys.

Types

रीतिका काकतुण्डी च द्विविधं पित्तलं भवेत्।
सन्ताप्य काञ्जिके क्षिप्त्वा ताम्राभा रीतिका मत।।
(R.R.S. 5/191–192)

Pittala is of 2 types
1. Reetika Pittala
2. Kakatundi Pittala

Grahya Lakshana

प्रखरानलसन्तप्तं काञ्जिके परिषेचितम्।
ताम्रप्रभं भवेद्यत्तु जात्यं तत्पित्तलं मतम्।। (R.T. 22/5)

When pittala (brass) is heated until red-hot and immersed in kanji, it takes on the appearance of copper. Such a treated sample of pittala is deemed suitable for both pharmaceutical and therapeutic applications.

Agrahyata Lakshana

तप्तं यत्पित्तलं वह्नौ निषिक्तं गृहवारिणि।
लौहप्रभं भवेत्कामं तद्धेयमिह कीर्तितम्।। (R.T. 22/6)

If a sample of pittala (brass), when heated red-hot and immersed in kanji (fermented rice water), takes on the appearance of black iron, it is deemed unsuitable for pharmaceutical or therapeutic purposes.

Shodhana

तप्त्वा क्षिप्त्वा च निर्गुण्डीरसे श्यामारजोऽन्विते।
पञ्चवारेण संशुद्धिं रीतिरायातिनिश्चितम्। (R.R.S. 5/197)

1. Arrange foils of pittala (brass) and prepare a vessel containing nirgundi swarasa mixed with haridra churna (turmeric powder).
2. Heat the pittala foils until they become red-hot.
3. Immerse the heated foils immediately into the prepared vessel with the mixture.
4. Repeat the process of heating and dipping a total of seven times.
5. After the seventh cycle, allow the foils to dry completely.
6. Store the dried foils in a suitable container as shuddha pittala.

Marana

Method 01

पत्रीकृतं पित्तलं तु समगन्धशिलान्वितम्।
कन्यानीरेण संम्पिष्टं शोषितं सम्पुटे न्यसेत्।।
त्रिवारं पुटयेदेवं भस्म स्यात्कज्जलप्रभम्।
एवं मृतं पित्तलं तु वीतशङ्कः प्रयोजयेत्।। (R.T. 22/15-16)

1. Take thin foils of shuddha pittala (5 pala; 250 gms) and cut them into small pieces.
2. In a clean khalva yantra (mortar), add equal quantities of shuddha gandhaka (purified sulfur) and Shuddha Manahshila (purified realgar).
3. Mix the ingredients thoroughly by adding the required amount of Ghritakumari Svarasa (aloe vera juice).
4. Triturate the mixture until a consistent paste is formed.
5. Dry the triturated mixture under the hot sun until completely dehydrated.
6. Enclose the dried powder in a sharava samputa (a covered crucible) and subject it to one gajaputa (a high-temperature heating process).
7. Repeat the entire process (trituration, drying, and incineration) three times to achieve a blackish, smooth kajjali-like bhasma of pittala.
8. Store the final pittala bhasma in airtight containers for pharmaceutical and therapeutic applications.

Method 02

निम्बूरसशिलागन्धवेष्टिता पुटिताऽष्टधा।
रीतिरायाति भस्मत्वं ततो योज्या यथायथम्।
ताम्रवन्मारणं तस्याः कृत्वा सर्वत्र योजयेत्। (R.R.S. 5/198-199)

1. Cut thin foils of shuddha pittala (5 pala; 250 gms) into small pieces.
2. Place these pieces in a clean khalva yantra (mortar).
3. Add equal quantities of shuddha gandhaka (purified sulfur) and shuddha manahshila (purified realgar).
4. Thoroughly triturate the mixture by adding the required amount of nimbu svarasa (lemon juice).
5. Dry the triturated mixture under the hot sun until fully dehydrated.
6. Enclose the dried powder in a sharava samputa (a covered crucible).
7. Subject the sealed crucible to one gajaputa (a high-temperature heating process).
8. Repeat the entire process of trituration, drying, and incineration eight times.
9. The resulting blackish, smooth kajjali-like bhasma of pittala is collected.
10. Store the prepared bhasma in airtight containers for pharmaceutical and therapeutic applications.

Dose

पित्तलस्य प्रयोगस्तु रविलोहसमो मतः।
गुञ्जार्धतस्तु गुञ्जैकमिता मात्रा च युज्यते।। (R.T. 22/18)

Dose : ½ - 1 ratti (62 mgs -125 mgs).

Anupana

Madhu, Navanita

Properties

सुमृतं पित्तलं रूक्षं तिक्तं नातिविलेखनम्।
कृमिघ्नं कुष्ठशमनं पाण्ड्वामयविनाशनम्।। (R.T. 22/17)

Rasa: Tikta
Guna: Ruksha
Virya: Sheeta
Dosha: Pittahara
Karma: Shodhana, Lekhana
Therapeutic Indications: Krimi, Kushtha

Probable Physico-chemical Changes

1. During Shodhana Process

a. Physical Changes

- Brass foils become softer and lose their brittleness due to repeated heating and quenching cycles.
- Impurities on the surface are removed through thermal expansion, oxidation, and interaction with the liquid medium (Nirgundi Svarasa with turmeric).
- The foils appear smoother, indicating removal of contaminants and impurities.
- Minor weight reduction occurs due to the removal of oxides and impurities.

b. Chemical Changes

- High heat induces partial oxidation of zinc and copper, leading to superficial oxide layer formation.
- Turmeric and Nirgundi Svarasa act as mild reducing agents, neutralizing toxic impurities like excess zinc or lead.
- The immersion in liquid medium allows chemical interaction, aiding impurity removal and surface modification.

2. During Marana Process

a. Physical Changes

- Triturating with Gandhaka and Manahshila reduces particle size, enhancing surface area for chemical interactions.
- The final Bhasma turns blackish and smooth (Kajjali-like) due to chemical transformations and high-temperature incineration.
- Pittala transitions from metallic foils to an amorphous, non-metallic ash-like substance.

b. Chemical Changes

- **Oxidation**
  - **Zinc and Copper Oxides**: High-temperature Gajaputa converts zinc and copper into their stable oxides:
    - ZnO (Zinc oxide)
    - CuO [Copper (II) oxide]

    These oxides are bio-compatible and non-toxic.
- **Sulfidation**
  - Sulfur from Gandhaka forms sulfides with copper and zinc during the heating process:
    - CuS (Copper sulfide)
    - ZnS (Zinc sulfide)

    Sulfides stabilize the metals and enhance therapeutic properties.
- **Reduction of Toxicity**

  Toxic impurities, including lead or unreacted zinc, are neutralized during the high-temperature cycles, ensuring a safe product.
- **Amorphization**

  The crystalline structure of brass breaks down due to repeated heating and grinding, converting it into an amorphous form.

Yoga

1. Pittala rasayana
2. Meghanada rasa
3. Svarnasindura
4. Sadanana rasa
5. Ratnaprabha vati
6. Ekadasayana rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pittala (Brass) in Traditional Indian Knowledge System: A Review	Punam Kumari, MD Scholar, P.G. Department of RSBK, Uttrakhanda, Haridwar, Uttrakhanda, India.	Brass (Pittala), an alloy of copper and zinc, has been historically used in Ayurveda, with references in texts like Charaka Samhita and Sushruta Samhita for therapeutic instruments. Known as "Riti" in ancient times, it was later termed Pittala, and in Kautilyas Arthashastra as Arakuta. Brass exhibits antifouling properties, killing microorganisms quickly. Ethno-medicinally, it is used for treating Raktapitta, Krimi, Kushtha, and Pandu Roga. Pittala Bhasma retains the properties of copper and zinc, with a bitter taste and variable temperament, depending on the processing method. Its preparation is simpler compared to copper-based Bhasma.

Sr.No.	Article Name	Author Name	Result
2.	Critical Review of Pharmaceutical, Analytical and Toxicity Characterization of Pittala Bhasma	Rolli Ghildiyal, Post Graduate Scholar, Dept. of RSBK, Uttarakhand Ayurved, University, Rishikul Campus, Haridwar, Uttarakhand, India.	In classical texts, Pittala, a copper-zinc alloy, has been utilized for treating various ailments. However, in modern times, standardization has become essential to ensure the availability of authentic samples. It is crucial to assess pharmaceuticals in terms of validation, safety, and analytical standardization. To develop a standardized approach for analysis and gain a deeper understanding of drug behavior, advanced analytical tools and data analysis are required. This article provides insight into the development of standard operating procedures for Pittala and highlights the use of sophisticated techniques for its analysis and standardization in Ayurvedic practices.

Vartaloha

Introduction

- Vartaloha is a white-colored alloy metal primarily used for making utensils.
- It is also known by various names in classical texts, including panchaloha, pancha rasa, bharta, and vartula.
- Historical references to vartaloha date back to the 13th century.
- This alloy is composed of five metals: kamsya (bronze), tamra (copper), pittala (brass), loha (iron), and naga (lead).
- Equal parts of these metals are melted together to produce vartaloha.

Synonyms

पञ्चलोहं पञ्चरसं वर्तुलं भर्तीमित्यपि। (Ay.Pra. 4/83)

Panchaloha, Pancha Rasa, Vartula and Bharta.

Shodhana

आदौ तैलादिके शोध्यं पञ्चनाज्याऽजमूत्रके।
निर्घिष्टे शुद्धिमायाति पञ्चलोहं न संशयः।। (Ay.Pra. 4/84)
दुग्धम्लजले क्षिप्तं वर्तलोहं विशुद्धयति।। (R.R.S. 5/215)

1. Collect thin foils of Vartaloha (bronze).
2. Prepare a vessel containing either Aja-Mutra (goat's urine) or Haya-Mutra (horse's urine).
3. Place the bronze foils in a furnace or over a suitable heating apparatus.
4. Heat the foils until they become red hot.
5. Using tongs, carefully remove the red-hot foils from the furnace.
6. Immediately dip them into the vessel containing the urine (Aja-Mutra or Haya-Mutra).
7. Ensure the foils are fully submerged in the liquid.
8. Remove the foils from the urine and allow any excess liquid to drip off.
9. Reheat the foils until red hot again.
10. Repeat the process of heating and dipping for a total of seven cycles.
11. After the seventh cycle, rinse the foils thoroughly with clean water.
12. Dry the purified foils and store them for further use.

Marana

अर्कक्षीरेण सम्मिश्रगन्धतालकलेपनात्।
पञ्चकुम्भिपुटैर्भंतं म्रियते योगवाहकम्।। (Ay.Pra. 4/85)
म्रियते गन्धतालाभ्यां पुटितं वर्तलोहकम्।। (R.R.S. 5/216)

1. Cut the thin foils of Shuddha Vartaloha (1 part) into small pieces and place them in a clean khalva yantra.
2. Add equal quantities of Shuddha haratala and Shuddha Gandhaka to the khalva yantra.
3. Thoroughly triturate the mixture by adding the required quantity of Arka Dugdha.
4. Dry the triturated mixture under the hot sun.
5. Enclose the dried powder in a Sharava Samputa.
6. Subject the Sharava Samputa to one Gajaputa process.
7. Repeat the entire process five times to achieve properly prepared Vartaloha bhasma.
8. Store the finished product in suitable air-tight containers for pharmaceutical and therapeutic use.

Dose

Dose: ½ to 1 ratti (62 mgs -125 mgs)

Anupana

Honey, Ghrita

Properties

क्षिप्तमत्रं कटुकं रूक्षं कफपित्तविनाशनम्।
रक्तं खत्वं कृमिघ्नञ्च नेत्र्यं मलविशोधनम्।।
तद्भाण्डे साधितं सर्वमन्नव्यञ्जनमूपकम्।
अत्रेण वर्जितञ्चापि दीपनं पाचनं हितम्।। (R.R.S. 5/213-214)

Rasa: Katu
Guna: Ruksha
Virya: Shita
Vipaka: Amla
Dosha: Kapha- Pittahara
Karma: Dipana, Pachana, Netra Roga
Therapeutic Indications: Agnimandya, Tvaka Roga, Krimi, Netra Roga.

Probable Physico-Chemical Changes

1. During Shodhana Process

- Repeated heating and quenching soften the metal while reducing brittleness.
- Impurities, oxides, and debris are removed due to chemical interaction with Aja-Mutra or Haya-Mutra.
- Slight reduction in weight due to oxidation and impurity detachment during heating cycles.
- The foils may develop a darker or reddish hue due to oxide layer formation.

2. During Chemical Changes

- **Oxidation**

a. High-temperature heating forms surface oxides:
1. CuO [Copper(II) oxide]
2. SnO_2 (Tin oxide)
3. These superficial oxides are removed during quenching in urine.

- **Detoxification**

a. Aja-Mutra or Haya-Mutra acts as a chelating agent, binding with toxic impurities like lead or excess tin and neutralizing them.
b. Organic compounds in the urine interact with the metal, enhancing detoxification.

- **Metal Purity Enhancement**

Repeated thermal cycling helps segregate impurities, leaving behind a purified metallic structure.

3. During Marana Process

a. Physical Changes

- Grinding with Shuddha Gandhaka and Haratala reduces the bronze into fine particles, increasing its surface area for chemical reactions.
- The metallic foils transform into a soft, ash-like substance (Kajjali-like), indicating a complete loss of metallic properties.
- The final Bhasma becomes smooth, blackish, or ash-colored, signifying complete transformation.

b. Chemical Changes

- **Oxidation**

During Gajaputa heating, metals in Vartaloha (copper and tin) form their respective oxides:
CuO [Copper(II) oxide]
SnO_2 (Tin oxide)
These oxides are bio-compatible and suitable for therapeutic purposes.

- **Sulfidation**

Gandhaka reacts with metals to form sulfides
CuS (Copper sulfide)
SnS_2 (Tin disulfide)
These sulfides stabilize the metals, enhancing their medicinal efficacy.

- **Integration of Organic Components**

Organic compounds from Arka Dugdha decompose during heating, leaving carbon residues that bind with oxides and sulfides to enhance bioavailability.

- **Amorphization**

Repeated grinding and heating break down the crystalline structure of the metal, converting it into an amorphous state, making it easily absorbable.

Research Updates

No Data Found

Manikya (Ruby)

Introduction

- Manikya holds a prestigious position among precious gems and has been valued since ancient times for its therapeutic and astrological importance; it is one of the best among the Nava Ratnas.

- Its inclusion in Ayurvedic formulations dates back to the Samhita period, during which it was regarded as one of the costliest gems.
- Acharya Somadeva, the renowned author of Rasendra Chudamani and several other books, is credited with pioneering the preparation of Manikya Bhasma under the category of Sarva Ratna Marana.
- Its origin has a highly symbolic meaning in mythology. It was during the Vamana avatar that Lord Vishnu overpowered King Bali.
- The story goes that when the Lord touched his body with his holy feet, it was changed into 84 types of precious stones. Manikya, in particular, is believed to have taken birth from the drops of Bali's blood.
- Astrologically, Manikya resonates with Surya—the Sun—which is very often referred to as Raviratna because it gives much about the energy of the Sun.

Synonyms

माणिक्यं रङ्गमाणिक्यं पद्मरागसमाह्वयम्।
रविरत्नं शोणरत्नं कुरुविन्दं च लोहितम्।। (R.T. 23/43)

Manikya, Ranga Manikya, Padmaraga, Ravi Ratna, Shona Ratna, Kurvinda, Lohitam.

Minerological Identification

Properties	Identification
Chemical Name	Aluminium Oxide
Chemical Composition	Al_2O_3
Colour	Deep Red
Cleavage	None
Luster	Viterus, Pearl
Streak	White
Specific Gravity	3.97 – 4.05
Hardness	9
Fracture	Conchoidal
Dispersion	0.017
Transparency	Transparent to Translucent
Tenacity	Brittle

Sources

Myanmar

1. **Mogok Valley**: Historically famous for "pigeon's blood" rubies; quality finds have declined.
2. **Mong Hsu**: Dominant ruby source since the 1990s.
3. **Namya**: Newly discovered ruby deposits in Kachin State.

Global Ruby Mining

- Modern Discoveries:
- **Kenya**: Waseges River (2002).
- **Mozambique**: Montepuez deposits (2009).
- **Greenland**: Ruby reserves beneath melting ice.

Spinel Connection

- **Spinel**: Often found with rubies in gem gravels or marble. Red spinel, similar in appearance, can rival rubies in value.

Types

माणिक्यं पद्मरागाख्यं द्वितीयं नीलगन्धि च।। (R.R.S. 4/8)

Two Types of Manikya

Sr. No.	Manikya Type	Colour	Guna
1.	Padmaraga	Like Red Rose	unctuous, heavy lustrous, cylindrical and even sized
2.	Neelagandhi	Red from outside but possesses Bluish colour from within	Similar to Padmaraga.

Depending on colour

1. Rakta (reddish)
2. Pitabha (yellowish)
3. Haritabha (greenish)
4. Raktabha pita (reddish yellow)

Grahya Lakshan

रक्तोत्पलदलच्छायं रम्यं दीप्तप्रभं परम्।
वृत्तायतं समाङ्गञ्च माणिक्यं जात्यमुच्यते।। (R.T. 23/44)

1. Exhibits a vibrant red hue, akin to the "Rakta Kamala Patra" (red lotus petal).
2. Distinguished by exceptional beauty and a captivating appearance.
3. Features a lustrous, glossy exterior.
4. Favored qualities include a round, smooth, and elongated form.
5. High-quality rubies are deemed optimal for Ayurvedic and pharmaceutical purposes.

Agrahyata Lakshan

विच्छायं लघु धूमाभं विरूपं कर्कशं परम्।
मलिनं चिपिटं वक्रं माणिक्यं त्याज्यमुच्यते।। (R.T. 23/45)

1. Dull or non-brilliant rubies are undesirable.
2. Unusually light rubies are not preferred.
3. Smoky or unclear hues make the ruby unsuitable for pharmaceutical use.
4. Shapeless or irregular forms are rejected.
5. Rough or uneven surfaces disqualify the ruby.
6. Impurities or an unclean appearance reduce acceptability.
7. Flat-bodied rubies are considered unsuitable for pharmaceutical applications.

Shodhana

Method 01

निम्बूकस्वरसेनेह दोलायन्त्रे विधानतः।
यामैकं स्वेदितं कामं माणिक्यं शुद्धिमाप्नुयात्।। (R.T. 23/46)

1. Pound the ruby into smaller pieces and secure it in a clean cloth pottali (bundle).
2. Assemble the Dolayantra for Svedana (steaming).
3. Use Nimbu Svarasa (lemon juice) or another suitable Amla Dravya Svarasa (sour liquid) as the medium.
4. Suspend the pottali in the liquid, ensuring full submersion without touching the vessel base.
5. Heat gently for 3 hours (one yama), maintaining a steady temperature.
6. Remove the pottali, open it, and wash the ruby with clean water.
7. Dry the purified ruby under shade or with a clean method.
8. Store in an airtight container to maintain purity.

Method 02

निम्बूकाम्लयुतं वारा माणिक्यं चषकस्थितम्।
सुताप्रदीपे सम्यक्वं शुद्धिमायात्यनुत्तमाम्।।
आविष्कृतो विधिरयं गुरुवर्यमहोदयैः।
प्रकाशितं खलु मया भिषजां हितकाम्यया।। (R.T. 23/48-49)

1. Place the required quantity of Manikya in a clean glass beaker.
2. Submerge the ruby in diluted citric acid.
3. Position the beaker on a tripod stand with a spirit lamp providing controlled heat.
4. Heat gently for 2–3 hours, maintaining a steady boil and monitoring liquid levels.
5. Let the beaker cool naturally, then collect the purified Manikya.
6. Dry thoroughly, preferably in shade, and store in an airtight container.

Marana

Method 01

विमलीकृतमत्यर्थं माणिक्यं सुविचूर्णितम्।
शिलालगन्धैर्विमलैः पृथक् तु समभागिकैः।।
निम्बूकस्वरसेनेह पेषयेद्दिनसप्तकम्।
विन्यसेत्सम्पुटे घर्मे विशुष्कं कृतचक्रिकम्।।
ततस्तु पुटयेद्धीमान् पुटे वारणसंज्ञके।
रीत्यानया सुपुटितमष्टवारं प्रयत्नतः।।
माणिक्यं म्रियते भस्म जायते पाण्डुरप्रभम्।
पिष्टं तु लकुचद्रावैः पुटेदेवमथापि वा।। (R.T. 23/50-53)

1. Triturate 1 part Shuddha Manikya with equal parts Shuddha Manahshila, Shuddha Haratala, and Shuddha Gandhaka into a fine, uniform mixture.
2. Mix the powder with Nimbu Svarasa and triturate in a Khalva Yantra for seven days.
3. Shape the mixture into uniform Chakrikas (pellets) and sun-dry until moisture-free.
4. Place the dried pellets in a Sharava Samputa, seal, and heat using one Gajaputa. Allow to cool naturally.
5. Repeat the Gajaputa process 8 times, re-triturating with fresh Nimbu Svarasa, drying, and reshaping pellets each time.
6. After the 8th Gajaputa, the Bhasma should appear pale white, indicating readiness.
7. Store in an airtight container to preserve therapeutic quality.

Method 02

चूर्णीकृतं शोणरत्नं विमलैः समभागिकैः।
पेषयेन्निम्बुकद्रावैर्बलिरोगशिलेङ्गुलैः।।
विमर्द्य सुदृढे खल्वे यत्नेन सप्तवासरम्।
पुटयेद्वारणपुटे विशुष्कं कृतचक्रिकम्।।
रीत्यानयापि पुटितमष्टवारमसंशयम्।
माणिक्यमचिरादेव मृतिमाप्नोत्यनुत्तमाम्।। (R.T. 23/54-56)

1. Powder 1 part Shuddha Manikya in a Khalva Yantra.
2. Add equal parts of Shuddha Gandhaka, Shuddha Manahshila, and Shuddha Hingula to the powdered Manikya.

3. Triturate into a homogeneous mixture.
4. Mix with Nimbu Svarasa and triturate for seven days.
5. Shape the mixture into Chakrikas (pellets) and sun-dry until moisture-free.
6. Place pellets in a Sharava Samputa, seal, and heat with one Gajaputa.
7. Cool naturally post-heating.
8. Repeat the process 8 times, re-triturating with fresh Nimbu Svarasa, reshaping, and reheating.
9. After the 8th Gajaputa, the Bhasma should be pale white. Store in an airtight container to maintain purity.

Pishti

1. Take Shuddha Manikya in a clean Khalva Yantra.
2. Triturate the Manikya thoroughly to convert it into a fine powder.
3. Add the required quantity of either Gulaba Jala (rose water) or Ketaki Arka (distillate of Pandanus odorotissimus) to the powdered Manikya.
4. Triturate the mixture thoroughly in the Khalva Yantra for one full day until the mixture becomes smooth and uniform.
5. Continue the trituration process until a very fine pink-colored powder is obtained, ensuring homogeneity and fineness.
6. Collect the prepared Manikya Pishti and transfer it to a suitable airtight container.
7. Store in a cool, dry place to maintain its quality and potency.

Dose

आरभ्य गुञ्जापादांशात् गुञ्जार्द्धप्रमितं मृतम्।
माणिक्यं योजयेद्धीमान् बलकालाद्यपेक्षया।। (R.T. 23/59)

Dose: 1/4th ratti to ½ ratti (31 to 62 mgs)

Anupana

Honey and Butter.

Properties

माणिक्यं सुमृतं मेध्यं मधुरं तु रसायनम्।
दीपनं वृष्यमायुष्यं वातपित्तहरं परम्।।
कफप्रशमनं स्निग्धं क्षयरोगनिषूदनम्।
वाजीकरणमत्यन्तं ध्वजभङ्गहरं मतम्।। (R.T. 23/57-58)

Rasa: Madhura

Guna: Snigdha

Virya: Shita

Dosha: Vata Kapha Hara

Karma: Medhya, Dipana, Vrishya, Kashaya

Therapeutic Indications: Karmaja Vyadhi, Bhuta-Preta Badha.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- The ruby loses external impurities, dirt, and residues due to prolonged steaming in acidic (Nimbu Svarasa) liquid.
- Surface hardness slightly reduces due to exposure to acidic medium, aiding further processing.
- The ruby's surface may exhibit a brighter appearance, indicating the removal of impurities.

b. Chemical Changes

- Lemon juice (Nimbu Svarasa) reacts with oxides or metallic impurities on the ruby's surface, dissolving or neutralizing them.
- Any toxic elements present are leached out or neutralized by the acidic medium during the steaming process.

During Marana Process

a. Physical Changes

- Triturating the ruby with Shuddha Manahshila, Haratala, and Gandhaka reduces it to a fine powder.
- Repeated heating in Gajaputa and triturations with acidic mediums disrupt the crystalline structure, converting the ruby into a amorphous, ash-like form.
- The final Bhasma appears pale white, indicating complete transformation.
- Slight weight reduction due to volatilization of sulfur and other reactions during Gajaputa heating.

b. Chemical Changes

- **Oxidation**

  High-temperature Gajaputa oxidizes trace metals or impurities in the ruby, forming stable oxides that integrate into the Bhasma matrix.

- **Sulfidation**

  Gandhaka and Manahshila contribute sulfur, reacting with impurities and aiding stabilization of the final product.

- **Acidic Interaction**

  Nimbu Svarasa (lemon juice) interacts with mineral components of the ruby during trituration, promoting bioavailability.

- **Amorphization**

  Repeated heating and grinding disrupt the crystalline structure, converting ruby into a bio-compatible amorphous form.

Yoga

1. Brahmi Vati
2. Mani Parpati
3. Navaratna Rajamriganka Rasa
4. Javahara Mohara Pishti
5. Ratnabhagottara Rasa

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Critical Appraisal of Manikya: A Ratna	Gunal, PG Scholar, Dept. of RSBK, National Institute of Ayurveda, Jaipur, Rajasthan, India.	Manikya, one of the Nava Ratna gemstones, is highly valued for its therapeutic properties. Its use in various Ayurvedic formulations dates back to the Samhita period. Acharya Somadeva, the author of Rasendra Chudamani, is credited with pioneering the introduction of Manikya Bhasma under Sarva Ratna Marana, highlighting its significance in Ayurvedic medicine.

Tarkshya (Emerald)

Introduction

- Takshya, the prized green gemstone, is valued for its rarity, durability, and vibrant green hue, with deeper colors being more desirable.
- Heat treatment can transform its color into blue-toned Aquamarine, another Beryl family gemstone.
- The green coloration arises from trace amounts of chromium or vanadium.
- Flawless emeralds are rare, as most have natural inclusions.
- To enhance their appearance, they are often treated with oils or synthetic lubricants.
- Counterfeits, like pale stones bonded with dark green paste, can be identified through hardness testing.
- Though hard, Takshya is brittle and prone to fractures from heavy impacts or temperature fluctuations, adding to its delicate allure.

Synonyms

गारुत्मतं मरकतं तार्क्ष्यं गारुडसंज्ञकम्।
बुधरत्नं रौहिणेयं हरिद्रत्नश्च तन्मतम्।। (R.T. 23/104)

Garutmata, Marakata, Garuda Mani, Budha-Ratna, Rauhineya and Haridra.

Minerological Identification

Properties	Identification
Chemical Name	Aluminium Silicate
Chemical Composition	$Be_3Al_2(SiO_3)_6$
Colour	Bluish Green
Cleavage	Imperfect
Luster	Vitreous
Streak	White
Specific Gravity	2.67 – 2.75
Hardness	7.5 – 8
Fracture	Conchoidal
Dispersion	0.015
Transparency	Opaque

Sources

- **Ancient Sources**: Predominantly mined in Egypt, India, and Austria.
- **Modern Sources**: Found in Afghanistan, Australia, Bulgaria, Cambodia, Canada, China, Ethiopia, Germany, Italy, Kazakhstan, Madagascar, Mozambique, Namibia, Nigeria, Norway, Pakistan, Russia, Somalia, South Africa, Spain, Switzerland, Tanzania, United States, Zambia, and Zimbabwe.

Types

Depend upon colour- 3 types

1. White Emerald- Common

2. Blue Emerald - Medium
3. Green Emerald - Best

Grahya Lakshna

सच्छायं मसृणं स्वच्छं गुरु स्निग्धञ्च कोमलम्।
अव्यङ्गञ्च हरिद्वर्णं जात्यं मरकतं मतम्।। (R.T. 23/105)

1. Displays a brilliant and glowing appearance.
2. Transparent, free of visible impurities.
3. Heavy, indicating high quality and density.
4. Soft and smooth, aiding in processing.
5. Uniform and evenly formed.
6. Symmetrical, flawless, and visually captivating.
7. Exhibits a subtle yellowish-green hue, signifying purity.

Agrahyata Lakshna

रूक्षन्तु विगतच्छायं विकृताङ्गं खरं लघु।
सत्रासं चातिमलिनं हेयं मरकतं मतम्।। (R.T. 23/106)

1. Lacks moisture and radiance.
2. Missing brilliance or glow, signifying poor quality.
3. Uneven or asymmetrical form.
4. Coarse texture, complicating processing.
5. Feels unnaturally light, indicating lower quality.
6. Inconsistent shades, showing impurities.
7. Cloudy or unclean, reflecting lack of purity.

Shodhana

सुरभीपयसा यामं दोलायन्त्रे विधानतः।
विपाचितं मरकतं विशुद्ध्यति सुनिश्चितम्।। (R.T. 23/107)

1. Pound Tarkshya into small pieces and tie it securely in a clean cloth to form a pottali.
2. Use a dolayantra with cow's milk (godugdha) as the medium.
3. Suspend the pottali in the milk, ensuring full submersion without contact with the vessel's bottom.
4. Heat for three hours (one yama) to gently steam (svedana) the emerald.
5. Remove and open the pottali, then wash the emerald with clean water.
6. Dry completely in a clean, dust-free environment.
7. Store the dried, purified Tarksya in an airtight container to maintain quality.

Marana

माणिक्यमारणोद्दिष्टविधिभ्यामतियत्नतः।
अष्टधा पुटितं ताक्ष्यं म्रियतेऽत्र न संशयः।। (R.T. 23/108)

The process involves eight puta cycles similar to Manikya Bhasma preparation:

1. Purify Tarksya and grind into a fine powder using a khalva yantra.
2. Combine equal parts of Shuddha gandhaka, Shuddha manahshila, and either Shuddha Haratala or Shuddha hingula with the powdered emerald.
3. Add nimbu svarasa and triturate for seven days to form a pliable paste.
4. Shape the mixture into chakrikas (pellets) and dry under sunlight.
5. Place dried pellets in Sharava samputa and perform one gajaputa cycle.
6. Repeat the process for eight cycles, each time triturating with fresh nimbu svarasa and reshaping pellets.
7. After eight cycles, obtain pale white Tarkshya Bhasma, and store in an airtight container for pharmaceutical use.

Pishti

1. Place Shuddha Tarksya (purified emerald) in a khalva yantra and triturate into a fine powder.
2. Add sufficient gulaba jala (rose water) to create a uniform paste.
3. Triturate continuously in the khalva yantra for three days, ensuring thorough mixing.
4. Achieve a greenish-white color and distinct rose fragrance in the final mixture.
5. Transfer the prepared Tarkshya pishti to a clean container and store in an airtight container to maintain purity and efficacy.

Dose

आरभ्य गुञ्जापादांशाद् गुञ्जैकप्रमितं परम्।
मृतं मरकतं युञ्ज्यात् बलकालाद्यपेक्षया।। (R.T. 23/111)

Dose : 1/4th – ½ Ratti (31 to 125 mgs)

Anupana

Madhu, Navanita

Properties

मृतं मरकतं बल्यं विषघ्नं वह्निदीपनम्।
ओजोविवर्द्धनं वृष्यं पाण्डुशोफनिषूदनम्।।

श्वासच्छर्दिप्रशमनं गुदजामयनाशनम्।
समाख्यातं विशेषेण सन्निपातनिबर्हणम्।। (R.T. 23/109-110)
मरकतं विषघ्नं हि शीतलं मधुरं रसे।
अम्लपित्तहरं रुच्यं पुष्टिदं भूतनाशनम्।। (Ay.Pra. 5/105)

Rasa: Madhura
Guna: Shita
Virya: Shita
Dosha: Kaphapittahara
Karma: Ojovardhaka, Vishahara, Ruchikara, Pushtikara
Therapeutic Indications: Jvara, Chardi, Mandagni, Arsha, Panduroga, Shula, Amlapitta.

Probable Physico-chemical Changes

1. During Shodhana Process

a. Physical Changes

- The emerald loses external impurities, dirt, and surface residues through gentle steaming in Godugdha (cow's milk).
- Steaming does not compromise the crystal structure but softens superficial imperfections.
- The emerald may exhibit a shinier, cleaner appearance after purification.

b. Chemical Changes

- Organic components in cow's milk, such as case in and fats, react with oxides and other impurities on the emerald's surface, aiding in detoxification.
- Minor trace elements or toxic residues are leached out or neutralized by milk's mild acidic and enzymatic properties.

2. During Marana Process

a. Physical Changes

- Grinding with Shuddha Gandhaka, Manahshila, and other ingredients reduces the emerald into fine particles, increasing its surface area.
- Repeated Gajaputa cycles disrupt the crystalline structure, transforming the emerald into an amorphous form.
- The emerald transitions from its natural green to pale white in the final Bhasma form, indicating complete conversion.

b. Chemical Changes

- **Oxidation**: High-temperature Gajaputa oxidizes trace metallic impurities in the emerald, forming stable oxides.
- **Sulfidation**: Sulfur from Gandhaka and other sulfurous ingredients reacts with emerald components, forming sulfides that stabilize the final product.
- **Acidic Interaction**: Trituration with Nimbu Svarasa promotes chemical interactions, enhancing the bioavailability of the final Bhasma.
- **Amorphization**: Repeated heating and grinding convert the emerald into a bio-compatible amorphous state, facilitating absorption in the body.

Yoga

1. Mani Parpati
2. Javahara Mohara Vati
3. Ratnabhagottara Rasa
4. Navaratna Raja Mriganka Rasa

Research Updates

Not Found

Pushparaga (Topaz)

Introduction

- Gemstones, including Pushparaja (topaz), have been integral to Indian culture and tradition.
- Mentioned in sacred texts like the Shrimad Bhagavata, epics such as the Mahabharata, and classical works like the Brihat Samhita.
- Recognized for their medicinal applications as early as the Samhita period, including gems like emerald.
- Development of detailed processes for purification, incineration, and pishti preparation of gemstones.
- These advancements allowed the incorporation of gemstones into Ayurvedic practices, enhancing their therapeutic potential.

Synonyms

पुष्पराजः पुष्परागः पीतरक्ताह्वयस्तथा।
गुरुरत्नं पीतमणिः स एव गुरुवल्लभः।। (R.T. 23/87)

Pusparaja, Pushparaga, Pitarakta, Guru (Brihaspati) ratna, Pitamani and Guruvallabha.

Minerological Identification

Properties	Identification
Chemical Name	Aluminum Oxide
Chemical Composition	Al_2O_3

Properties	Identification
Colour	Yellow
Cleavage	None
Luster	Vitreous
Streak	Colorless
Specific Gravity	3.90 – 4.01
Hardness	9
Fracture	Uneven
Tenacity	Brittle
Transparency	Transparent to little Opaque

Sources

Global Occurrence of the Mineral

This mineral is commonly found alongside fluorite and cassiterite in diverse regions worldwide, including:

- **Asia**: Afghanistan, Sri Lanka, Pakistan, and Japan.
- **Europe**: Ural and Ilmen Mountains (Russia), Czech Republic, Germany, Norway, Sweden, and Italy.
- **Africa**: Nigeria.
- **Australia**: Flinders Island.
- **North America**: United States and Mexico.
- **South America**: Brazil.

Types

According to Yuktikalpataru

1. Padmaragavata
2. Marakatavata

Depend Upon Colour

1. Shveta
2. Pitta
3. Aruna
4. Pitta Shveta

Grahya Lakshana

स्निग्धं समं सुमसृणं तु सुवर्णवर्णं स्वच्छं परं सुविमलं तु सुवृत्तगात्रम्।
यत्कर्णिकारकुसुमप्रभमुज्ज्वलञ्च जात्यं तदेव गदितं खलु पुष्पराजम्।।
निकषोपलसंघृष्टं वर्णं पुष्णाति यन्निजम्।
पुष्पराजन्तु तज्जात्यं मतं रत्नपरीक्षकैः।। (R.T. 23/88-89)

1. Smooth and easy to process.
2. Uniform and symmetrical form.
3. Exhibits a golden sheen.
4. Resembles the brightness and hue of 'aragvadha pushpa' (yellow flowers).
5. Intensifies when rubbed on a smooth surface.

Agrahyata Lakshana

श्यामलं निष्प्रभं कर्कशं द्व्यक्षकं कृष्णबिन्दुङ्कितं शर्कराङ्गप्रभम्।
उन्नतं त्वानतं यच्च रूक्षं परं पुष्पराजं मतं तत्तु हेयं बुधैः।। (R.T. 23/90)

1. Exhibits a blackish shade, deviating from the ideal appearance.
2. Without brilliance, dull or lustreless in appearance.
3. It is rough and unequal, showing the presence of imperfections.
4. Include imperfections, like ocelli-like structures with two large black spots.
5. Has the appearance of a bolus of sand with some irregularities in its structure.
6. Feels dry and is characterized by an uneven body.

Shodhana

कुलत्थक्वथितोपेतैः काञ्जिकैः स्वेदितं समम्।
दोलायन्त्रे पुष्पराजं यामैकेन विशुद्ध्यति।। (R.T. 23/91)

1. Break Pushparaga into small pieces and wrap in a clean cloth to form a pot tali (bundle).
2. Mix equal parts of Kulattha Kvatha (horse gram decoction) and Kanji (sour gruel).
3. Suspend the pottali in the liquid medium using a Dolayantra.
4. Boil for 3 hours (one yama).
5. Remove, extract, and dry the Pushparaga in a clean, shaded area.
6. Store the purified Shuddha Pushparaga in an airtight container for future use.

Marana

माणिक्यमारणोद्दिष्टविधिभ्यामतियत्नतः।
मारयेत्पुष्पराजन्तु रसतन्त्रविचक्षणः।। (R.T. 23/92)

The incineration methods used for Pushparaga are identical to the first and second methods outlined for the preparation of Manikya Bhasma.

Pishti

1. Take Shuddha Pushparaga and place it in a clean Khalva Yantra ('mortar and pestle').
2. Grind it thoroughly to obtain a fine powder.
3. Add an appropriate amount of Gulaba Jala to the powdered Pushparaga.
4. Continue the trituration of the mixture in the Khalva Yantra for a continuous period of three days.
5. Make sure the mixture reaches a really fine, pale white powder consistency.
6. The finished product should have a distinct rose fragrance of the Gulaba Jala.
7. Transfer prepared Pushparaga Pishti to an airtight container.
8. Store it in a cool, dry place for future use.

Dose

आरभ्य गुञ्जापादांशाद् गुञ्जैकप्रमितं परम्।
सुमृतं पुष्पराजन्तु प्रयुञ्जीत भिषग्वरः।। (R.T. 23/95)

Dose: 1/4th – 1 Ratti (31 to 125 mgs)

Anupana

Madhu, Navnita

Properties

पुष्पराजन्तु शिशिरं दीपनं पाचनं परम्।
कफवातप्रशमनं कुष्ठच्छर्दिनिबर्हणम्।।
विषघ्नं दाहशमनं गुदजामयनाशनम्।
मेध्यं बृंहणमायुष्यं रसज्ञैः परिकीर्तितम्।। (R.T. 23/93-94)

Guna: Laghu, Shita
Virya: Shita
Dosha: Kaphavata Nashaka
Karma: Medhya, Dipana, Pachana, Brihmana, Ayushkara, Medhya.
Therapeutic Indications: Chardi, Daha, Raktapitta, Gudaja Amaya, Visha.

Probable Physico-Chemical Change

1. During Shodhana Process

a. Physical Changes

- The rough surface of Pushparaga becomes smoother and cleaner as external impurities are removed through boiling in Kulattha Kvatha and Kanji.
- Prolonged steaming slightly softens any sharp edges, aiding in further processing.
- The gemstone's color becomes more uniform, indicating the removal of surface contaminants.

b. Chemical Changes

- Kanji (sour gruel) and Kulattha Kvatha act as mild acidic and enzymatic agents, reacting with oxides or metallic impurities on the Pushparaga surface.
- Trace elements and toxic residues (if present) are leached out or neutralized by the acidic medium.
- Organic compounds in Kulattha Kvatha and acidic components of Kanji bind with impurities, enhancing purification.

2. During Marana Process

a. Physical Changes

- Repeated grinding with ingredients like Shuddha Gandhaka and Manahshila reduces Pushparaga into submicron particles, increasing its surface area.
- The crystalline structure of Pushparaga breaks down during repeated Gajaputa cycles, converting it into an amorphous, ash-like form.
- The final Bhasma transforms into a pale white color, signifying complete conversion.

b. Chemical Changes

- **Oxidation**: High-temperature Gajaputa oxidizes any trace metallic impurities or residues in Pushparaga, forming stable oxides.
- **Sulfidation**: Sulfur from Shuddha Gandhaka reacts with trace metals or compounds, forming sulfides that stabilize the final product.
- **Amorphization**: The repeated cycles of grinding and heating convert Pushparaga from a crystalline to an amorphous state, making it more bio-compatible.
- **Acidic Interaction**: Trituration with acidic mediums like Nimbu Svarasa enhances chemical transformation, promoting bioavailability.

Yoga

1. Navaratnarajamriganka rasa
2. Mani parpati
3. Ratnabhagottara rasa

Research Updates

No Data Found

Nilama (Sapphire)

Introduction

- Gemstones have been used by people in India since time unknown.
- Nila Ratna or sapphire has captivated the hearts of people across all ages.

- The earliest recorded evidence of sapphire can be obtained from Brihat Samhita by Varahamihira in the 5th century CE.
- With the evolution of Rasashastra, the science of gemstones developed over the centuries.
- The techniques of their purification, incineration, and preparation of Pishti, along with their integration into therapeutic practices, were developed in a systematic manner, underlining the multifunctional utility of Ayurveda.

Synonyms

नीलो नीलोपलो नीलं नीलरत्नं सुनीलकम्।
महानीलञ्च नीलाश्मशनिरत्नञ्च कीर्तितम्।। (R.T. 23/96)

Nila, Nilotpala, Nilaratna, Sunilaka, Mahanila, Nilashama and Nilaratna.

Minerological Identification

Properties	Identification
Chemical Name	Aluminum Oxide
Chemical Composition	Al_2O_3
Colour	Blue
Cleavage	Poor
Luster	Vitreous
Streak	Colorless
Specific Gravity	3.95 – 4.05
Hardness	9
Fracture	Conchoidal
Tenacity	Brittle
Transparency	Transparent to little Opaque

Sources

- Sapphires are sourced from alluvial deposits or underground mines.
- Major mining regions include Myanmar, Madagascar, Sri Lanka, Australia, Thailand, India, Pakistan, Afghanistan, Tanzania, Kenya, and China.
- Renowned gemstones like the Logan Sapphire, Star of India, and Star of Bombay originate from Sri Lankan mines.
- The sapphire deposits of Kashmir remain iconic in the gem industry, despite limited peak production primarily occurring in the late 19th and early 20th centuries.
- Kashmiri sapphires are highly prized for their exceptional quality and vibrant blue hue.
- A sapphire from Kashmir holds the world record for the highest price-per-carat at auction.

Types

जलनीलेन्द्रनीलञ्च शक्रनीलं तयोर्वरम्। (R.R.S. 4/49)
श्वैत्यगर्भितनीलाभं लघु तज्जलनीलकम्।
काष्ण्यर्गर्भितनीलाभं सभारं शक्रनीलकम्।। (R.R.S. 4/50)

Sr. No	Nilam Type	Charaterstics
1.	Jalaneela	White internally and Blue externally, Laghu
2.	Indraneela	Blue colour inside and Black externally, Guru

Grahya Lakshana

स्वच्छं सच्छायममलं मसृणं तु महोज्ज्वलम्।
स्निग्धं गुरु लसज्ज्योतिर्जात्यं नीलं मतं बुधैः।। (R.T. 23/97)

1. Must be crystal clear and free from visible impurities.
2. Exhibits a vibrant and radiant appearance.
3. Should be semi-transparent, allowing some light to pass through.
4. Possesses a bright and lustrous surface.
5. Feels soft and smooth to the touch.
6. Heavy in comparison to other stones of similar size.
7. Displays a bright and vivid blue hue.

Agrahyata Lakshana

रक्ताद्धं विगतच्छायं रूक्षं लघु च कोमलम्।
परिहेयं शौरिरत्नं मतं रत्नपरीक्षकैः।। (R.T. 23/98)

1. Exhibits a combination of reddish and bluish shades rather than a uniform blue color.
2. Appears opaque, lacking clarity or translucence.
3. Has a rough and uneven surface.
4. Feels light compared to the ideal sapphire.
5. Displays malleability or brittleness, which are undesirable traits.

Shodhana

नीलीस्वरससंयुक्तं दोलायन्त्रे विधानतः।
यामैकं परिपक्वन्तु नीलं शुद्धयति निश्चितम्।। (R.T. 23/99)

1. Break Nila into small fragments and tie securely in a clean cloth to form a pottali.
2. Prepare Nila Svarasa (herbal juice) as the medium for purification.

3. Suspend the pottali in Nila Svarasa within a Dolayantra.
4. Steam for 3 hours (one yama).
5. Extract, dry the Nila in a shaded area, and store it airtight.

Marana

प्राणिक्यमारणोद्दिष्टविधिभ्यामतियत्नतः।
मारयेच्छ्रेनिरत्नं तु रसागमविशारदः।। (R.T. 23/100)

The methods followed for calcination of Nila are the same as the two described above (1st and 2nd methods followed to obtain Manikya Bhasma under the relevant heading).

Pishti

1. Take Shuddha Nila Ratna and place it in a clean Khalva Yantra (mortar and pestle).
2. Add an appropriate quantity of Gulaba Jala (rose water) to the powdered Nila Ratna.
3. Triturate the mixture continuously in the Khalva Yantra for three days.
4. Ensure the powder becomes very fine, pale white in color, and carries a distinct rose fragrance.
5. Transfer the prepared Nila Ratna Pishti into an airtight container.
6. Store it in a cool, dry place for future use.

Dose

गुञ्जाष्टमांशप्रमितात् गुजार्द्धप्रमितं परम्।
सुमृतं नीलरत्नं तु प्राणाचार्यः प्रयोजयेत्।। (R.T. 23/103)

Dose: 1/8th – ½ ratti (15 to 62 mgs)

Anupana

Madhu, Navanita

Properties

नीलं तु सुमृतं वृष्यं बल्यं दीपनमुत्तमम्।
त्रिदोषशमनं वर्ण्यं गुदजामयनाशनम्।।
त्वच्यं कुष्ठादिदोषघ्नं श्वासकासनिषूदनम्।
कफपित्तानिलहरं विषमज्वरनाशनम्।। (R.T. 23/101-102)
श्वासकासहरं वृष्यं त्रिदोषघ्नं सुदीपनम्।
विषमज्वरदुर्नामपापघ्नं नीलमीरितम्।। (R.R.S. 4/53)

Doshaghanta: Tridoshahara
Karma: Medhya, Vrishya, Varnya, Ayushya.
Therapeutic Indications: Kasa, Shvasa, Raktapitta, Guda Roga, Kushtha, Vishama Jvara.

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

Size reduction, enhanced brightness, and possible weight loss.

b. Chemical Changes

Removal of impurities, infusion with herbal juice, and oxidation/reduction reactions.

During Marana Process

a. Physical Changes

Color change to ash, structural breakdown into fine powder, and reduced density.

b. Chemical Changes

Decomposition of organics, formation of metal oxides, and stabilization of therapeutic components.

Yoga

1. Navratnarajamriganka rasa
2. Maniparpati
3. Ratnabhagottara rasa

Research Updates

Not Found

Gomeda (Zircon or Cinnamone Stone)

Introduction

- Gomeda (zircon) has captivated people for centuries and holds a significant place in Indian history.
- The first known references to zircon appear in the Brihat Samhita of Varahamihira, dating back to the 5th century.
- Over time, as Rasashastra (the ancient science of alchemy) developed, the purification, incineration, pishti preparation, and therapeutic applications of gemstones, including Gomeda, became an established practice.
- The unique properties of Gomeda have long been valued not only for their beauty but also for their therapeutic potential in traditional medicine.

Synonyms

गोमेदकश्च गोमेदः पिङ्गस्फटिक इत्यपि।
गोमेदो राहुरत्नञ्च कीर्तितञ्च तमोमणिः।। (R.T. 23/120)

Gomedaka, Pinga-Sphatika, Rahu-ratna, Tamomani

Minerological Identification

Properties	Identification
Chemical Name	Zirconium Silicate
Chemical Composition	$ZrSiO_4$
Colour	Yellow, Brown, Red
Cleavage	Imprefect
Luster	Vitreous
Streak	Colorless
Specific Gravity	4.65
Hardness	7.5
Fracture	Uneven
Tenacity	Brittle
Transparency	Translucent to Transparent
Dispersion	0.038

Sources

1. Zircon is a resilient mineral known for its hardness, durability, and chemical inertness, which allows it to persist in sedimentary deposits.
2. It is a common component of many sands but fine crystals of zircon are relatively rare. This mineral is found in a wide range of locations globally, including countries like Norway, Germany, Russia, and the USA (especially in New York and New Jersey, and near Green River), as well as in Canada, Sri Lanka, and Australia.
3. In India, zircon is primarily found in the states of Bihar, Uttar Pradesh, Kerala, and Tamil Nadu.

Types

Depend Upon Colour:

1. Shvetabha
2. Raktabha
3. Pitta
4. Krishna Pita

Grahya Lakshana

सुस्वच्छगोजलच्छायं स्वच्छं स्निग्धं समं गुरु।
निर्दलं मसृणं दीप्तं गोमेदं शुभमष्टधा।। (R.R.S. 4/54)

1. Must be clean and devoid of impurities.
2. Should exhibit a yellowish-brown hue resembling gomutra (cow's urine).
3. Should feel snigdha (smooth and oily to the touch).
4. Must have a uniform and even surface.
5. Should feel heavy, indicating high quality.
6. Must possess a natural shine with effective light reflection.
7. Should have a smooth, soft texture without sharp or jagged edges.
8. Should display a healthy, glowing brilliance.

Agrahyata Lakshana

सत्रासं विगतच्छायं चिपिटं मलिनप्रभम्।
सदलं लघु रूक्षं च गोमेदं हेयमीरितम्।। (R.T. 23/122)

1. Presence of mixed or inconsistent colors.
2. Exhibits little to no natural glow.
3. The gemstone has a flat and unappealing form.
4. Displays a lackluster or dirty shine.
5. Shows signs of multiple layers within the stone.
6. Feels unusually light, indicating poor quality.
7. Has a coarse or uneven texture.

Shodhana

निम्बुकस्वरसेनेह दोलायन्त्रे विधानतः।
परिस्विन्नं तु यामैकं शुद्धिमायात्यनुत्तमाम्।। (R.T. 23/123)

1. Break the Gomeda into smaller fragments by roughly pounding to ensure even exposure during purification.
2. Wrap the pounded Gomeda in a clean cotton cloth and tie it securely to form a Pottali (bundle).
3. Assemble the Dolayantra and fill it with freshly extracted Nimbu Svarasa (lemon juice) as the steaming medium.
4. Suspend the Pottali in the lemon juice, ensuring full immersion.
5. Steam the Pottali for 3 hours (one Yama) under controlled heat.
6. Carefully remove the Pottali, unwrap it, and thoroughly wash the Gomeda with clean water to remove residual impurities.
7. Dry the Gomeda completely in a shaded, dust-free environment to maintain its purity.
8. Store the purified Gomeda (Shuddha Gomeda) in an airtight container to ensure its quality and prevent contamination.

Marana

माणिक्यमारणोद्दिष्टविधिभ्यामतियत्नतः।
अष्टवारं सुपुटितं गोमेदं मृतिमाप्नुयात्।। (R.T. 23/124)

1. Purify the Shuddha Gomeda using standard purification methods.
2. Ensure it is prepared in a form suitable for incineration, following similar procedures used for Manikya.
3. Perform incineration using the methods applied for Manikya Bhasma preparation.
4. Subject the Gomeda to eight Puta (heating cycles), maintaining appropriate temperature and conditions during each cycle.
5. Inspect the Gomeda after each Puta to ensure uniform processing and readiness for the next cycle.
6. Upon completing the incineration, evaluate the Gomeda Bhasma for its physical and chemical properties to confirm it meets preparation standards.

Pishti

1. Grind Shuddha Gomeda into a fine powder using a clean Khalva Yantra.
2. Mix the powdered Gomeda with the required amount of rose water (Gulaba Jala).
3. Triturate the mixture in the Khalva Yantra continuously for 3 days until it becomes a fine, pale white powder with a rose fragrance.
4. Store the prepared Gomeda Pishti in an airtight container to preserve its quality and fragrance.

Dose

आरभ्यं गुञ्जापादांशाद् गुजैकप्रमितं मृतम्।
गोमेदं तु प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/127)

Dose: 1/4th – 1 Ratti (31 to 125 mgs)

Anupana

Madhu, Navanita

Properties

गोमेदकं रुचिकरं दीपनं पाचनं परम्।
त्वग्दोषशमनं बल्यं कफपित्तप्रणाशनम्।।
उष्णं पाण्ड्वामयहरं क्षयक्षयकरं परम्।
समाख्यातं विशेषेण बुद्धिसंवर्द्धनं तथा।। (R.T. 23/125-126)

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Experimental Study of Sushrutokta Jalaprasadana Vidhi with Special Reference to Gomeda	Amit Achyut Pal, Research Scholar, SDM College of Ayurveda, Karantaka, Udupi.	Water quality varies with its source, and impurities are linked to Janapadodhwamsa Vyadhi (epidemics) in Ayurveda. While modern purification methods like filters and chemicals are widely used, Ayurveda offers traditional techniques such as Jalaprasadana Vidhi. This study explored water purification using Gomeda (Hessonite) in glass and earthen vessels. Observations were statistically analyzed using ANOVA and unpaired t-tests. Results confirmed Gomeda's effectiveness in reducing impurities, validating its potential as a natural and Ayurvedic water purification method. These findings highlight Gomeda's role in improving water safety while providing essential data for its application and standardization.

गोमेदं कफपित्तघ्नं क्षयपाण्डुक्षयङ्करम्।
दीपनं पाचनं रुच्यं त्वच्यं बुद्धिप्रबोधनम्।। (R.R.S. 4/56)
गोमेदकोऽम्ल उष्णश्च वातकोपविकारजित्।
दीपनः पाचनश्चैव धृतोऽयं पापनाशनः।। (Ay.Pra. 5/116)

Rasa: Amla
Guna: Ushna
Virya: Ushna
Dosha: Kaphapitta Ghana
Karma: Dipana, Pachana, Ruchivardaka, Tvachya
Therapeutic Indications: Pandu Roga, Kshaya

Probable Physico-chemical Changes

During Shodhana Process

a. Physical Changes

- Fragmentation, increased surface exposure, and removal of impurities.
- Brightened appearance and enhanced luster.

b. Chemical Changes

- Dissolution of soluble impurities in Nimbu Swarasa.
- Possible oxidation-reduction reactions and infusion of acidic properties from lemon juice.

During Marana Process

a. Physical Changes

- Transformation into fine ash (Bhasma) with structural breakdown.
- Color change and reduction in density.

b. Chemical Changes

- Decomposition of organic residues and formation of stable metal oxides.
- Enhanced bioavailability and stabilization of therapeutic compounds through repeated heating cycles.

Yoga

1. Ratnabhagottara Rasa
2. Navaratnarajamriganka Rasa

Vaidurya (Cats eye)

Introduction

1. Gemstones have played a vital role in Indian history, captivating generations with their beauty and symbolism.
2. Among these, Vaidurya (Cat's Eye) stands out for its unique allure and mystique. Ancient texts like the Shrimad Bhagavatam, Mahabharata, and Brihat Samhita highlight its significance.
3. The medicinal properties of gemstones, including Manikya (Ruby), were recognized during the Samhita period, with references in the Charaka Samhita acknowledging their therapeutic use.
4. The evolution of Rasashastra brought systematic methods for purifying, incinerating, and preparing Pishti from gemstones like Vaidurya, enhancing their medicinal applications and solidifying their importance in Ayurveda.
5. Even today, Vaidurya is esteemed for its healing and spiritual benefits, preserving a legacy deeply rooted in ancient Indian wisdom.

Synonyms

विदूररत्नं वैदूर्यं केतुरत्नं विदुरजम्।
विडालाख्यं विडालाक्षं वायजञ्च प्रकीर्तितम्।। (R.T. 23/112)

Vidura ratna, Ketu ratna, Viduraja, Vilalakhya, Vidalaksha and Vayaja.

Minerological Identification

Properties	Identification
Chemical Name	Aluminate of Beryllium
Chemical Composition	$BeAl_2O_4$
Colour	Colorless, Yellow, Pale Sheen
Cleavage	Perfect
Luster	Viterous
Streak	White
Specific Gravity	3.56 – 3.85
Hardness	8.5
Fracture	Uneven
Tenacity	Brittle
Transparency	Transparent to Translucent
Dispersion	0.013

Sources

Cat's Eye (Vaidurya) is sourced globally from regions such as Sri Lanka, Brazil, China, Myanmar, Russia, Norway, and the United States.

In India, the gemstone is predominantly found in Jammu and Kashmir, renowned for its high-quality gemstones.

Types

Depend upon Colour

1. Shveta
2. Krishnabha
3. Dhumra
4. Mishrita

Grahya Lakshana

वैदूर्यं श्यामशुभ्राभं समं स्वच्छं गुरु स्फुटम्।
अभ्रशुभ्रोत्तरीयेण गर्भितं शुभमीरितम्।। (R.R.S. 4/57)

1. Should have a blackish-white hue.
2. Must possess an even and uniform shape, ensuring its suitability.
3. Should be soft to touch, indicating high quality.
4. Must be heavy, reflecting its authenticity and density.
5. Should exhibit a bright, lustrous sheen, resembling the brilliance of fine mica within.

Agrahyata Lakshana

विच्छायं लघु रूक्षञ्च संत्रासं चिपिटं खरम्।
कृष्णं तथा मृच्छिलाढ्यं वैदूर्यं हेयमीरितम्।। (R.T. 23/114)

1. Dull and devoid of natural luster.
2. Feels unusually light, indicating poor quality.
3. Lacks vitality, appearing lifeless and dry.
4. Shows inconsistent or blended hues, affecting purity.
5. Features an unattractive, flat structure.
6. Has a coarse, uneven texture.
7. Displays a dark or murky black coloration.
8. Contains impure, muddy spots within its body.

Shodhana

त्रिफलाक्वथितोपेतं वैदूर्यं याममात्रकम्।
दोलायन्त्रे परिस्विन्नं शुद्धिमायात्यनुत्तमाम्।। (R.T. 23/115)

1. Break the emerald into medium-sized pieces using a clean, controlled method.
2. Create a decoction by boiling 1 part Triphala powder in 16 parts water until the liquid reduces to 1/4th. Filter it to obtain a clear decoction.
3. Wrap the pounded emerald fragments securely in a clean cotton cloth to form a pottali (bundle).

4. Suspend the pottali in the prepared Triphala Kwatha using a Dola Yantra setup. Steam the bundle gently for 3 hours over a low flame.
5. Once steaming is complete, carefully remove the pottali, unwrap the emerald, and wash it thoroughly. Dry the emerald in a shaded area to preserve its integrity.
6. Place the Suddha Vaidurya (purified emerald) in a clean, airtight container for safe storage.

Marana

माणिक्यमारणोद्दिष्टविधिभ्यामतियत्नतः।
विदूरत्नं पुटितं त्वष्टधा मृतिमाप्नुयात्।। (R.T. 23/116)

a. Method 01

1. Grind the Shuddha Vaidurya (purified emerald) into a fine powder using a mortar and pestle.
2. Triturate the powdered emerald with lemon juice or the specified Bhavana Dravya until a smooth, homogeneous paste is formed.
3. Spread the prepared paste evenly inside a clay saucer (Sharava).
4. Cover it with another clay saucer, and seal the edges securely using a cloth smeared with clay to create the Sharava Samputa.
5. Place the sealed Samputa in a pit, cover it with cow dung cakes, and ignite them.
6. Allow the cakes to burn completely, ensuring uniform heating.
7. After cooling, open the Samputa carefully, collect the material, and repeat the entire process.
8. Perform a total of eight Puta cycles to achieve the desired transformation.

b. Method 02

1. Powder the purified emerald and triturate it with lemon juice or an alternate Bhavana Dravya until a smooth consistency is achieved.
2. Apply the paste as a thin layer in a clay saucer. Seal it with another clay saucer to create a Sharava Samputa.
3. Place the sealed Samputa in a pit filled with cow dung cakes and subject it to uniform heating.
4. After each heating cycle, open the Samputa, collect the product, and prepare it for the next cycle.
5. Repeat the Puta process for eight cycles to obtain Vaidurya Bhasma.
6. The final product should be white, soft, and fine like ash, ensuring it meets the criteria for therapeutic applications.

Pishti

1. Take the Shuddha Vaidurya in a clean Khalva Yantra and grind it to obtain a fine powder.
2. Add an appropriate quantity of Gulaba Jala to the powdered Vaidurya.
3. Triturate the mixture thoroughly in the Khalva Yantra for 3 days, ensuring continuous and even grinding until a fine, pale white powder with a rose fragrance is obtained.
4. Transfer the prepared Vaidurya Pishti to a suitable airtight container to preserve its quality and fragrance.

Dose

वस्वंशतो रक्तिकाया वैदूर्यं गुञ्जसम्मितम्।
प्राणाचार्यः प्रयुञ्जीत बलकालाद्यपेक्षया।। (R.T. 23/119)

Dose: 1/4th – 1 Ratti (31- 125 mg)

Anupana

Madhu, Navanita

Properties

वैदूर्यं रक्तपित्तघ्नं प्रज्ञायुर्बलवर्द्धनम्।
पित्तप्रधानरोगघ्नं दीपनं मलमोचनम्।। (R.R.S. 4/59)
सुमृतं खलु वैदूर्यं मधुरं शिशिरं परम्।
दीपनं मेध्यमायुष्यं बल्यं च मलभेदनम्।।
रक्तपित्तप्रशमनं चक्षुष्यं बृंहणं परम्।
पित्तामयप्रशमनं समाख्यातं विशेषतः।। (R.T. 23/117-118)

Rasa: Madhura
Guna: Shita
Virya: Shita
Dosha: Tridoshahara
Karma: Medhya, Dipana, Malabehedana.
Therapeutic Indications: Raktapitta, Gulma, Pittaja Vikara.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Fragmentation into medium-sized pieces increases surface area.

- Enhanced luster and removal of surface impurities.

b. Chemical Changes

- Removal of water-soluble and acidic impurities due to the action of Triphala Kvatha.
- Interaction with herbal components, possibly infusing phytochemicals that enhance medicinal value.

During Marana Process

a. Physical Changes

- Transformation from crystalline emerald to a fine, bioavailable ash (Bhasma).
- Color change, structural breakdown, and density reduction.

b. Chemical Changes

- Decomposition of organic matter and stabilization of trace elements.
- Formation of metal oxides and complex silicates, enhancing bioactivity.
- Improved assimilation and reduced toxicity due to repeated heating (Puta cycles).

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Review on Vaidurya Ratna (Cat's Eye)	Pooja Mahamuni, PG Scholar, Department of Rasashastra & Bhaishajya Kalpana, MAM's Sumatibhai Shah Ayurved Mahavidyalaya, Hadapsar, Pune-28.	Vaidurya (Cat's Eye) holds significance in Rasashastra, used as Bhasma or Pishti with properties evaluated by traditional tests. Its Madhura and Sheeta qualities benefit Raktaja and Pittaja disorders, improve memory, strength, and vision, and alleviate constipation. Chrysoberyl, known for its chatoyancy, is prized for durability and optical beauty. Metaphysically, Cat's Eye protects against negativity, attracts wealth, and enhances intuition and focus. Medicinally, it aids in treating eye disorders, heart conditions, and persistent illnesses. Sillimanite Cat's Eye supports emotional healing and mental stability. Rare, high-quality specimens with sharp chatoyancy are highly valuable in both therapeutic and ornamental contexts.

Mriga Shringa (Stag Horn)

Introduction

- The term "antler" is derived from the Latin word antheloculae, meaning "in front of the eyes," where they grow from bony pedicles covered by skin.
- Antlers are structurally complex, branched, and made of solid bone.
- Horns, in contrast, are permanent, hollow, and unbranched.
- Antlers are temporary; they grow in spring and are shed annually after the mating season.
- Horns are permanent structures that are not shed.
- Horns are typically found on both males and females of certain species.
- Antlers are mostly found only on males, with the exception of reindeer and caribou.
- Antlers serve as secondary sexual characteristics and are functional primarily during the rutting season for mating purposes.
- Horns, on the other hand, serve different roles, such as defense or dominance display.
- Indian deer species like the musk deer (Family: Moschidae) and mouse deer (Family: Tragulidae), which belong to different families, do not have antlers.
- Antlers are often referred to as velvet antlers while they are still covered by a soft, velvety layer of skin during their growth phase.
- This comparison illustrates the distinct biological and functional differences between antlers and horns in various species.

Synonyms

मृगशृङ्गं त्वेणशृङ्गं तथा मृगविषाणकम्।
हरिणशृङ्गकञ्चैव समाख्यातं भिषग्वरैः।। (R.T. 12/103)

Mrigashringa, Tvenashringa, Mrigavishanaka, Harinashringa.

Minerological Identification

Properties	Identification
Chemical Name	Stage Horn
Chemical Composition	$Ca_3(PO_4)_2$
Colour	Dull White
Specific Gravity	0.7767
Smell	Burnt Sugar (Freshly Cut)
Margin	Compact

Sources

- The deer horn is considered a Jangama Dravya, referring to a category of substances derived from living organisms.
- The horn is collected from deer, particularly from antelopes, which are known for their prominent antlers.
- The stag deer historically inhabited the plains of the western United States during winter and forested open areas during summer.
- Deer in colder or mild climates shed their antlers each winter.
- New antlers begin to grow in spring, ensuring the availability of horns for collection during specific seasons.

Grahya Lakshana

कीटानुपहतं दीर्घं भाराढ्यं सुदृढं तथा।
अनेकशृङ्गसंयुक्तं मृगशृङ्गं वरं मतम्।। (R.T. 12/104)

1. Should be free of damage or infestation.
2. Must be long, heavy, and structurally strong.
3. Presence of multiple branches or points is preferred, indicating higher potency.
4. Antlers meeting these criteria are considered to retain optimal therapeutic properties.

Shodhana

Not mentioned.

Marana

मृगशृङ्गं समादाय करपत्रेण कर्तयेत्।
खण्डशः कारयित्वा च त्वङ्गाराग्नौ दहेत्ततः।।
सुदग्धञ्चाथ विज्ञाया खल्वे सञ्चूर्णयेद्भिषक् ।
रविदुग्धेन सम्पेष्य चक्रिकाः कारयेत्ततः।।
शरावसम्पुटान्तःस्थं पुटेत्तीव्राग्निना भिषक्।
त्रिवारं पुटनादेणविषाणं मृतिमाप्नुयात्।। (R.T. 12/105-107)

1. Select a clean, infestation-free Mrigashringa (deer antler) that is long, strong, and branched.
2. Clean thoroughly and cut into smaller pieces using a saw.
3. Burn the antler pieces over glowing charcoal until fully charred and turned to ash.
4. Grind the burnt pieces into a fine powder using a Khalva Yantra.
5. Mix the powder with Arka Dugdha (milk of Calotropis) to form a paste.
6. Shape the paste into uniform cakrikas (pellets).
7. Dry the pellets under sunlight.
8. Place the dried chakrikas in a sealed Sharava Samputa and subject them to a Gajaputa (traditional high-heat process).
9. Allow the apparatus to cool naturally.
10. Retrieve the material, triturate again with Arka Dugdha, reshape into pellets, and repeat the drying and Gajaputa process for 3 cycles.
11. After the third Gajaputa, the Mrigashringa Bhasma will be smooth, black, and ready for therapeutic use.

Alternative Method (White Bhasma)

Burn the antler in open air, triturate with Kumari Svarasa (aloe vera juice), and subject to 4–5 Gajaputa cycles to produce white Bhasma.

Dose

1 – 2 Ratti (125 – 250mgs)

Anupana

Go-Ghrita, Navnita, Madhu, Adraka Svarasa.

Properties

मृगशृङ्गसमुद्भूता विभूतिर्गव्यसर्पिषा।
विनाशयेत् क्षणादेव हच्छूलमतिदारुणम्।।
हरिणविषाणसमुत्था भूतिः क्षौद्रेण रक्तिमिता।
अपहरतीह निकामं हच्छूलं पार्श्वशूलञ्च।। (R.T. 12/108-109)

Rasa: Nirasa
Guna: Laghu, Snigdha
Virya: Ushna
Doshaghana: Kapha Vatahara
Karma: Balya, Hridya, Kapha Nisaraka.
Therapeutic Indications: Kasa, Shvasa, Pratikshya, Shirashula, Hridshula, Parshavashula.

Probable Physico-Chemical Changes

During the Shodhana Process

a. Physical Changes

- Cutting the antler into smaller pieces increases surface area for better purification and combustion.
- The solid antler structure breaks down into smaller, more manageable forms.
- Burning over charcoal converts the dense antler material into brittle, charred residue, facilitating grinding into a fine powder.
- Mixing with Arka Dugdha and drying creates uniform, hardened pellets (Chakrikas).

b. Chemical Changes

- Organic components in the antler burn off, reducing it primarily to mineral residues, including calcium phosphates and carbonates.
- Chemical interaction with Calotropis milk introduces bioactive compounds, enhancing medicinal potency.
- Repeated heating in Gajaputa converts the material into stable calcium-based compounds (like calcium oxide or phosphate), reducing toxicity and increasing bioavailability.

Yoga

1. Sarveshwara Rasa
2. Trinetra Rasa
3. Jaharamohar Vati
4. Balarka Rasa
5. Hridya Churna

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	A Literary Review on Mrigashringa – Antler or Horn	Krishna Ayyappa SGB Kankipati, Assistant Professor, Department of Rasashastra and Bhaishajya Kalpana, Sri Adi Siva Sadguru Alli Sahib Sivaaryula Ayurvedic Medical College and Research Center, Guntakal, India.	Acharya Sushruta and Vagbhata mention the stag deer (Karala Mriga) under Mamsa Varga but do not detail its horns. The use of Mrigashringa (stag horn) appears in texts like Rasatarangini, which outline its preparation and therapeutic applications. Ethically sourced Mrigashringa is processed into Bhasma, continuing Ayurveda's tradition of using animal-derived bio-waste like Kukkutandatwak and Shankha. Rich in calcium and other compounds, Mrigashringa Bhasma supports bone healing, acid-peptic disorders, and cardio-respiratory health, with effects exceeding its chemical composition.

Sikata (Silica)

Synonyms

बालुका सिकता प्रोक्ता शर्करा रेतिकाऽपि च। (Ay.Pra. 2/303)
Baluka, Shikata, Sharkara and Retika.

Minerological Identification

Properties	Identification
Chemical Name	Silicon Dioxide
Chemical Composition	SiO_2
Colour	Dark Silver- Gray to Bluish Brown
Cleavage	Absent
Luster	Metallic
Streak	Black
Specific Gravity	2.3
Hardness	6-7
Fracture	Conchoidal
Transparency	Opaque

Source

Sand and sand dunes are shaped by dynamic geological and environmental processes, showcasing the interplay between natural forces, time, and terrain.

1. Erosion of Rocks

- Rocks are subjected to long-term weathering by natural agents like wind, water, and temperature changes.
- The broken-down rock fragments are carried away by rivers, winds, or glacial movements, contributing to sediment accumulation.

2. Sediment Breakdown

- Over time, transported sediments undergo further disintegration, reducing into fine particles of sand.
- Sand typically consists of quartz, feldspar, or other minerals depending on the source rock.

3. Formation of Sand Dunes

- In arid regions, sand is transported and deposited by wind, forming dunes over time.
- Deserts, characterized by scarce vegetation and water, are the most prominent sites of sand dune formation.
- Different types of dunes (e.g., crescentic, linear, star-shaped) emerge depending on wind patterns and sand availability.

4. Marine Sand Origins

- Sand in marine environments originates from sediments carried into the sea by rivers and the erosion of coastal or underwater rocks.
- These forces further grind sediments, contributing to marine sand formation.

5. Extraction of Marine Sand

- Marine sand is an important resource mined for construction and industrial purposes.
- Europe is a major region for marine sand mining, owing to advanced technologies and widespread application.

Dose

3 – 6 Masha

Anupana

Milk

Properties

Rasa: Madhura
Guna: Shita
Virya: Shita
Doshaghanta: Vatahara
Karma: Lekhana, Santhapanashaka, Shrama Nashaka.
Therapeutic Indications: Urakshata, Raktastivana

Yoga

Siktavalehya

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Sikata Varga (Silicate-containing-compounds) in Ayurvedic Medicine: An Updated Review	Sharma Usha, Associate Professor, P.G. Department of Rasa Shastra & Bhaishjya Kalpana Uttarakhand Ayurved University, Rishikul Campus, Haridwar-249401, Uttarakhand, India.	The medicinal use of Sikata Varga dates back to the Samhita period and gained prominence in medieval Ayurvedic texts for treating diseases and in iatrochemistry. Despite variations in classification across texts, substances like Akika and Trinkant Mani are included in this group and are widely used in the Unani system. These drugs are primarily prepared as Pisti due to their low melting points and soft nature. Though they are affordable, easily available, and therapeutically potent, their clinical use is limited due to insufficient research on safety and efficacy. Among them, only Badarashma has been extensively studied.

Vyomashma (Sangeyashab-Jade)

Introduction

- Vyomashama is a distinct mineral drug, renowned for its celestial or sky-like qualities, as suggested by its name ("Vyoma" meaning sky).
- Soft and fibrous in texture, resembling compressed fibers.
- Exhibits pale white, yellowish, or reddish hues.
- A poor conductor of heat, making it highly suitable for thermal insulation.
- Its heat-resistant nature lends itself to the production of fire-protective materials.
- Shares similar characteristics with minerals of the Amphibole group, associating it with substances like Asbestos.
- Traditionally employed for protection against heat and fire, potentially used in crafting specialized clothing or insulation materials.

Synonyms

Bhima Pashana, Yashavashila, Harinmani, Haritashma, Vyomashma.

Minerological Identification

Properties	Identification
Chemical Name	Silicate of Calcium and Magnesium, Silicate of Sodium and Aluminum.
Chemical Composition	$Na(Al, Fe)Si_2O_6$
Colour	Green
Cleavage	None
Luster	Greasy
Streak	White
Specific Gravity	2.9 – 3.38
Hardness	6 – 7
Fracture	Splintery
Transparency	Opaque

Sources

- Found in metamorphic rocks and as alluvial pebbles and boulders.
- **Global Deposits**: Both jadeite and nephrite are extracted from: Russia, China, Guatemala, Japan, California (USA),
- **Nephrite Deposits**: Found in varying qualities in: Swiss Alps, New Zealand
- **Jadeite Deposits**: Myanmar is responsible for approximately 70% of the world's gem-quality jadeite.
- **Indian Deposits**: Occurs in the Kashmir and Ladakh regions.

Shodhana

1. Collect Vyomashma pieces.

2. Prepare purifying liquid: Fresh Gulaba Jala (rose water) or Arjuna Tvak Kvatha (decoction of Terminalia arjuna bark).
3. Heat Vyomashma pieces until red-hot.
4. Immerse the red-hot stones in the purifying liquid and allow them to cool completely.
5. Repeat heating and immersion for 21 cycles, using fresh liquid as needed.
6. Ensure Vyomashma is clean, free from impurities, and ready for medicinal use.

Marana

1. Use purified Vyomashma and prepare Arjuna Tvak Kvatha (decoction) or fresh Gulaba Jala as the liquid medium.
2. Grind Vyomashma with the prepared liquid in a clean mortar for 2 days to form a smooth paste.
3. Shape the paste into small, even-sized cakes.
4. Place the cakes in a sealed Sharava Samputa and heat using Gajaputa.
5. Repeat the heating and cooling process for 10–12 cycles.
6. After the final cycle, obtain fine, whitish Vyomashma Bhasma ready for medicinal use.

Pishti

1. Use powdered Shuddha Vyomashma and fresh, high-quality Gulaba Jala (rose water).
2. In a clean Khalva Yantra, gradually mix the powder with Gulaba Jala.
3. Triturate thoroughly until well-integrated.
4. Continue triturating until a smooth, uniform paste (Pishti) is achieved.
5. The Vyomashma Pishti is now ready for use in Ayurvedic formulations.

Dose

120 – 480 mgs

Anupana

Arjunasvarasa, Gulabajala, Navnita, Mishri.

Properties

Guna: Ruksha, Shita
Virya: Shita
Karma: Balya, Dipana, Medhya, Hridaya
Therapeutic Indications: Mutradaha, Shula, Ashmari, Pravahika, Raktapitta.

Probable Physico-Chemical Changes

During Shodhana Process

a. Physical Changes

- Repeated heating to red-hot and sudden immersion causes thermal shock, which cracks and removes surface impurities.
- Enhanced smoothness and luster, removal of external contaminants.

b. Chemical Changes

- Immersion in Gulaba Jala (rose water) or Arjuna Tvak Kvatha dissolves and removes water-soluble and heat-exposed impurities.
- Possible oxidation and phase transformation due to repeated heating cycles.
- Interaction with bioactive compounds from Arjuna or rose water might introduce therapeutic properties.

During Marana Process

a. Physical Changes

- Transformation into fine ash (Bhasma) with reduced particle size and increased surface area.
- Becomes whitish after repeated heating cycles, indicating complete calcination.

b. Chemical Changes

- Organic and volatile components are burned off, leaving stable, bioavailable minerals.
- Formation of oxides and silicates from the primary stone components.
- The high-heat process stabilizes the final product, reducing toxicity and enhancing bioactivity for therapeutic use.

Yoga

1. Vyomashma Pishti
2. Hridevapanari Churna
3. Jaharamohara Vati
4. Brahmi Vati

Research Updates

Not Found

Kausheyashma (Asbestos)

Introduction

1. Kousheyashma is a mineral drug resembling a stone formed from compressed fibers.

2. It features a soft texture with colors ranging from yellowish to reddish white, resembling silk threads.
3. Minerals from the Amphibole group share similar characteristics, associating Kausheyashma with
4. It is a poor conductor of heat, making it ideal for thermal insulation.
5. Its heat-resistant nature allows it to be crafted into fire-protective clothing.
6. Historically, its unique properties have been employed for heat and fire protection.

Minerological Identification

Properties	Identification
Chemical Name	Asbestos
Chemical Composition	$Mg_3Si_2O_5(OH)_4$
Colour	Green, Red, Blue, Yellow, White, Gray
Cleavage	Prismatic
Luster	Silky
Streak	White
Specific Gravity	2.4 – 3.3
Hardness	3 - 6
Fracture	Fibrous
Transparency	Opaque

Sources

- **Global Producers**: China and Russia are the leading producers.
  Significant deposits are located in the Ural Mountains (Russia), Appalachian Mountains (USA), and Canada.
- **India**: India imports asbestos mainly from Russia, Kazakhstan, Brazil, and China to fulfill its industrial requirements.
- **Domestic deposits are found in**: Rajasthan, Karnataka, Jharkhand, Andhra Pradesh, Odisha and Uttarakhand.

Shodhana

Not Mentioned

Marana

1. Clean Kausheyashma thoroughly and grind it into a fine powder using a Khalva Yantra.
2. Mix the powder with Ghritakumari Svarasa (Aloe vera juice) to form a uniform paste.
3. Shape into evenly sized Chakrikas (pellets).
4. Dry the Chakrikas under sunlight until moisture-free.
5. Place the dried Chakrikas in a Sharava Samputa (earthen saucer) and seal it with clay.
6. Heat the sealed Sharava Samputa in a furnace using one Gajaputa.
7. Cool, open, and collect the product.
8. Repeat the process for 5–7 cycles of *Gajaputa*.
9. After the final cycle, ensure the Bhasma is smooth, soft, and white.

Pishti

1. Take fine, impurity-free Kausheyashma powder.
2. Obtain high-quality, fresh Gulaba Jala (rose water).
3. Place the powder in a clean Khalva Yantra.
4. Gradually, add Gulaba Jala and triturate continuously for 3 days until a uniform, smooth paste is formed.
5. Ensure the Pishti has a homogenous, smooth texture.
6. The Kausheyashma Pishti is now ready for medicinal use.

Dose

4 Ratti – 8 Ratti (500 – 1000 mgs)

Anupana

Honey, Water, Milk, Kadali Kanda Svarasa.

Properties

Guna: Shita
Virya: Shita
Dosha: Pittahara
Karma: Balya, Varnaya, Rakta satambhana.
Therapeutic Indications: Raktapitta, Pradara, Prameha, Dantapuya, Raktastambhana.

Probable Physico-Chemical Changes

During Marana Process

a. Physical Changes

- Fine powder formation and increased surface area.
- Structural breakdown into soft, white Bhasma.
- Uniform heating and controlled oxidation during repeated cycles.

b. Chemical Changes

- Dehydration and removal of volatile substances.
- Oxidation of metal components into stable oxides.
- Stabilization of minerals and infusion of bioactive properties from Aloe vera.

Yoga

1. Shirastoda Gutika
2. Balashulari Churna
3. Vayu Gutika
4. Kalnara Parpam
5. Kasturyadi Gutika

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Standardisation Of Various Processes In The Preparation Of Kousheyashma Bhasma Accounting Its Clinical Utility	Nileena, PG Scholar, Department of Rasasastra and Bhaishajya kalpana, Government Ayurveda College v, Thiruvananthapuram, Kerala, India.	The preparation of Kousheyashma Bhasma followed traditional Ayurvedic methods with modifications based on feasibility and convenience. Gomutra was used for Shodhana due to its availability and therapeutic properties, employing the Saamp method with a 72-minute duration. The processed Kousheyashma weighed 487g, showing a slight weight loss and color change, likely due to impurity removal. For Marana, Bhavana was done using Harithamanjari Swarasa over three Puta cycles, enhancing therapeutic efficacy through particle size reduction and trace element incorporation. Heat during Samputeekarana facilitated repeated oxidation and reduction, yielding a fibrous-free, homogeneous final product suitable for therapeutic use.
2.	Experimental study on antiepileptic action of Kousheyashma Bhasma	Nidhin M M, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheswara College of Ayurveda and Hospital, Hassan, Karnataka, India	Kousheyashma Bhasma has demonstrated notable efficacy in reducing the latency period, clonic seizures, and mortality duration in PTZ-induced epilepsy models at therapeutic doses. The formulation also showed a decrease in the number of clonic convulsions and had an impact on myoclonic seizures when administered at twice the therapeutic dosage. Additionally, it exhibited significant effects on multiple parameters of epilepsy in the kindling model. Histopathological evaluations indicate its neuroprotective effects on brain cells. These findings collectively suggest that Kousheyashma Bhasma is a promising remedy for managing epilepsy.

Badarshama (Silicate of Lime)

Introduction

- Badarashma derives its name from its resemblance to the fruits of Badara (jujube). These mineral-like stones exhibit distinct physical and compositional characteristics that make them unique and significant in various traditional contexts, including Ayurveda.
- Named for its similarity to jujube fruits, particularly their seeds.
- Predominantly greyish Colour.
- Marked by distinct lines running along its surface.
- Ends taper symmetrically, mimicking the shape of a fruit seed.
- **Taste**: Completely tasteless.
- When split or viewed internally, the mineral exhibits a **greenish-white core**, adding to its distinctive aesthetic.
- Comprised mainly of **lime** and **grit**, which contribute to its unique texture and inert chemical properties.

Synonyms

Ashmabhid, Pashanabadara, Badaripashana

Minerological Identification

Properties	Identification
Chemical Name	Silicate of Lime
Chemical Composition	Si_4CaO_4
Colour	White, Gray
Cleavage	Perfect
Luster	Vitreous
Streak	White
Specific Gravity	2.86 – 3.09
Hardness	4 – 5
Fracture	Uneven
Transparency	Translucent

Sources

- Badarashma refers to the stones or seeds of the Badara plant, which is commonly identified as Ziziphus jujuba or Ziziphus mauritiana in Ayurvedic medicine. These stones are utilized after undergoing specific purification and preparation processes.

- The plants are found in tropical and subtropical regions, particularly:
- **India**: Widely cultivated in semi-arid areas like Rajasthan, Gujarat, Uttar Pradesh, and Maharashtra.
- **China**: A leading producer of Ziziphus jujuba.
- **South-East Asia**: Including countries such as Bangladesh, Sri Lanka, and Pakistan.
- The Badara plant is naturally hardy and thrives in wild or semi-wild environments.
- It is drought-resistant, making it prevalent in arid and semi-arid regions.

Shodhana

1. Gather the Badarashma (jujube stones) to be purified.
2. Extract fresh Mulika Swarasa (herbal juice) from the Mulika plant.
3. Place the Badarshama in a heating apparatus, such as an iron pan or furnace.
4. Heat them until they turn red-hot.
5. Using tongs, carefully transfer the red-hot stones.
6. Immediately immerse them into the prepared Mulika Svarasa, ensuring complete and uniform submersion.
7. After each immersion, allow the stones to cool.
8. Repeat the heating and quenching process seven times in total.
9. The Badarshama is now purified and free of impurities.

Marana

1. Take the purified Shuddha Badarashama and place it in a clean Khalva Yantra (traditional mortar and pestle).
2. Grind the material thoroughly to achieve a fine powder.
3. Mix the powdered Badarashama with an adequate quantity of Mulika Swarasa (herbal juice).
4. Triturate the mixture to form a homogenous paste.
5. Shape the paste into uniformly sized Chakrikas (pellets).
6. Spread the Chakrikas in direct sunlight to dry until they are completely moisture-free.
7. Place the dried Chakrikas into a Sharava Samputa (earthen saucer).
8. Seal the Sharava Samputa using clay to ensure it is airtight during the heating process.
9. Place the sealed Sharava Samputa in a furnace and heat it using one Gajaputa (a traditional high-heat procedure).
10. Allow the Sharava Samputa to cool completely after heating, then open it to collect the intermediate product.
11. Repeat the sequence of forming Chakrikas, drying, sealing in Sharava Samputa, and subjecting to Gajaputa six more times, making a total of seven Gajaputa.
12. After the seventh Gajaputa, evaluate the final product to ensure it meets the standards of a properly prepared Badarashama Bhasma.

Pishti

1. Obtain the fine powder of Shuddha Badarashama (purified jujube stone).
2. Check to ensure the powder is free of lumps and impurities.
3. Acquire fresh Gulaba Jala (rose water) of high quality.
4. Place the Shuddha Badarashama powder into a clean Khalva Yantra (traditional mortar and pestle).
5. Gradually add the required quantity of Gulaba Jala to the powder.
6. Triturate the mixture thoroughly and continuously for 3 days or until a smooth, uniform paste is achieved.
7. Ensure the Badarashama Pishti has a consistent, smooth texture and meets therapeutic quality standards.
8. The prepared Badarashama Pishti is now ready for use in medicinal formulations or other applications as needed.

Dose

4 Ratti – 8 Ratti (500 – 1000 mgs)

Anupana

Honey, Water, Milk, Kadali Kanda Svarasa

Doshaghanta: Pitta Shamaka.

Therapeutic Indications: Mutrashmari, Mutradaha, Mutrakrichchhra, Mutraghata, Upadamsha

Probable Physico-Chemical Changes

During Shodhana Process

- **Heating**
  - **Physical**: Thermal expansion and microfractures increase surface area.
  - **Chemical**: Oxidation of impurities, making them easier to remove.
- **Quenching in Mulika Svarasa**
  - **Physical**: Rapid cooling causes cracking and loosening of impurities.
  - **Chemical**: Organic acids in the herbal juice dissolve or neutralize toxins.
- **Repeated Cycles**
  - **Physical**: Enhanced cleansing through repeated thermal shock.
  - **Chemical**: Further detoxification and adsorption of beneficial compounds.
- **Physical**: Fine powder increases surface area for reactivity.
- **Chemical**: Herbal juice integrates active compounds, enhancing purification.
- **Formation of Chakrikas**
  - **Physical**: Pellets ensure uniform heating.
  - **Chemical**: Herbal absorption aids detoxification and transformation.
- **Drying in Sunlight**
  - **Physical**: Moisture removal concentrates active ingredients.
  - **Chemical**: Reduces volatilization during heating.
- **Gajaputa (High-Heat Treatment)**
  - **Physical**: Thermal expansion alters the crystalline structure.
  - **Chemical**: Oxidation, sublimation, and reduction detoxify and transform the material into Bhasma.

During Marana Process

- **Grinding and Mixing**

Yoga

Ela Panchaka Churna.

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Research Updates on Badarashma	Sunil Mandal, PG Scholar, Dept. of RSBK, Shri Dharmasthala Manjunatheshwara Ayurveda College, Udupi, Karnataka, India.	An extensive review was conducted to identify published research on Badarashma across both print and digital platforms, resulting in a total of ten studies. These included two experimental studies, one comparative pharmaceutico-analytical study, one case study, and six clinical trials. The pharmaceutico-analytical study provided preliminary standards for Badarashma, while experimental studies generated evidence supporting its diuretic properties. Clinical trials, particularly on Mutrashmari, demonstrated significant efficacy for both Badarashma Bhasma and Pishti. Overall, Badarashma Bhasma has shown therapeutic potential in managing conditions like Mutrakruchra, Mutrashmari, and Mutradaha. This compilation highlights that most research has focused on its diuretic properties, either as a single drug or in combination with other formulations.
2.	Comparative diuretic activity of badarashma bhasma and badarashma pishti in albino rats	Vani Belapu, Dept. of RSBK, Shri Dharmasthala Manjunatheshwara Ayurveda College, Udupi, Karnataka, India.	This study compared the diuretic effects of Badarashma Bhasma and Pishti in albino rats. At a dose of 45 mg/kg, Bhasma showed a significant increase in urine volume compared to the control, while Pishti had moderate effects. Sodium and chloride excretion were non-significant, but Bhasma reduced potassium excretion. Bhasma's diuretic activity was comparable to furosemide but lacked potassium-sparing effects, making it more effective than Pishti for therapeutic use.

Multiple Choice Questions

1. What is the chemical formula for Vaikrantha (Tourmaline)?

a. $NaAl_2Si_6O_{18}$

b. $Na\ (MgFeMnLiAl)_3\ Al_6\ (B_3O)_3\ (Si_6O_8)$

c. $KAlSi_3O_8$ d. $CaCO_3$

2. Which of the following regions in India are known for Vaikranta deposits?

a. Maharashtra and Kerala

b. Rajasthan and Gujarat

c. Tamil Nadu and Orissa

d. Andhra Pradesh and Telangana

3. What is the primary method used to purify Vaikranta during the Shodhana process?

a. Heating with Nimbu Svarasa

b. Svedana in Kulattha Kvatha

c. Mixing with Gandhaka and Hingula

d. Grinding in Khalva Yantra

4. Which of the following describes the physical appearance of Vaikranta crystals?

a. Cubic with smooth edges

b. Prismatic or columnar with triangular cross-sections

c. Hexagonal with flat surfaces

d. Amorphous with irregular shapes

5. Which therapeutic property is associated with Vaikranta in Ayurvedic medicine?

a. Tridoshaghna (Balances all three doshas)

b. Vata-pitta pacification only

c. Increases kapha levels

d. Reduces only pitta-related disorders

6. What is the chemical composition of Vimala (Iron Pyrite)?

a. FeO b. FeS_2

c. $CuFeS_2$ d. Fe_2O_3

7. What are the three main types of Vimala described in classical texts?

a. Hema Vimala, Tara Vimala, Kamsya Vimala

b. Svarna Vimala, Rajata Vimala, Tamra Vimala

c. Shveta Vimala, Rakta Vimala, Nila Vimala

d. Lohita Vimala, Kanchana Vimala, Kshaya Vimala

8. Which of the following liquids is used for the Shodhana (purification) of Vimala?

a. Nimbu Svarasa and Triphala Kvatha

b. Vasa Svarasa, Jambira Rasa, Meshashringi Rasa

c. Milk and Ghee

d. Honey and Vidanga

9. What is the primary therapeutic property of properly prepared Vimala Bhasma?

a. Balances Vata Dosha

b. Pacifies Pitta Dosha and acts as a rejuvenator

c. Enhances Kapha Dosha

d. Treats only Shvasa (respiratory disorders)

10. During the Marana process, what chemical reaction converts toxic components into stable forms?

a. Reduction of iron into pure metal

b. Formation of metallic sulfides through Gandhaka

c. Neutralization with alkalis

d. Leaching of impurities with water

11. What is the most likely modern mineral identification of Chapala?

a. Bismuth (Bi) b. Selenium (Se)

c. Lead (Pb) d. Tin (Sn)

12. Which of the following processes is used to purify Chapala during the Shodhana process?

a. Heating with cow milk

b. Bhavana with lemon, ginger, or karkotaka juice

c. Mixing with Triphala and boiling

d. Grinding with Nimbu Svarasa and Gandhaka

13. According to Rasashastra, how many main types of Chapala are there based on Rasa Ratna Samuchchaya and Rasa Tarangini?

a. Two b. Four

c. Six d. Eight

14. What are the primary therapeutic properties of Chapala?

a. Tridoshaghna, Rasayana, and Parada Bandhana

b. Vata pacification and Kapha enhancement

c. Antipyretic and antiseptic only

d. Strengthening muscles and calming the mind

15. During the Marana process, what reaction occurs between Chapala and sulfur?

a. Formation of stable metal sulfides

b. Conversion into soluble salts

c. Complete removal of sulfur from the compound

d. Neutralization of all acids

16. Rasaka is primarily associated with which mineral in classical texts?

a. Vanga b. Yashada

c. Pittala d. Tuttha

17. Which variety of Rasaka is described as resembling mud and is considered the best?

a. Mrittikaabha Rasaka

b. Gudaabha Rasaka

c. Pashanabha Rasaka

d. Durdana Rasaka

18. What is the primary method of purifying Rasaka according to classical texts?

a. Bhavana with lemon juice

b. Washing with water

c. Mixing with Haratala
d. Heating with Parada

19. What is the Rasa (taste) of Kharpara (Rasaka. as per classical properties?
a. Madhura, Amla b. Katu, Kashaya
c. Tikta, Lavana d. Madhura, Tikta

20. Which therapeutic indication is not listed for Kharpara Bhasma in classical texts?
A. Meha (urinary disorders)
B. Kushtha (skin diseases)
C. Raktapitta (bleeding disorders)
D. Arsha (piles)

21. What is the principal chemical composition of Anjana?
a. $Al_2O_3Al_2O_3$ b. $Sb_2S_3Sb_2S_3$
c. $Fe_2O_3Fe_2O_3$ d. $MgSiO_4MgSiO_4$

22. Which variety of Anjana is identified by its blue color and Guru Guna (heavy property)?
a. Sauviranjana b. Rasanjana
c. Pushpanjana d. Nilanjana

23. What is the general method of Anjana Shodhana (purification)?
a. Triturating with lemon juice and drying.
b. Bhavana with Bhringaraja svarasa for seven times.
c. Heating in a dolayantra with triphala kvatha
d. All of the above.

24. What is the recommended therapeutic dose of Anjana?
a. ½–1 ratti (62–125 mg)
b. 2–3 ratti (250–375 mg)
c. 5–6 ratti (500–750 mg)
d. 10 ratti (1250 mg)

25. Which variety of Anjana is specifically known for its yellowish color and is indicated for Mukha Roga (oral diseases)?
a. Srotoanjana b. Sauviranjana
c. Rasanjana d. Pushpanjana

26. What is the primary source of Kankushta in its current form?
a. Rhubarb
b. Garcinia morella (Mysore gambose tree)
c. Rheum genus plants
d. Babbula Mula

27. Which type of Kankushtha is considered superior based on its characteristics?
a. Renuka Kankushtha
b. Nalika Kankushtha
c. Blackish Yellow Kankushtha
d. Light and Dry Kankushtha

28. Which rasa (taste) is predominantly associated with Kankushtha?
a. Madhura and Lavana
b. Tikta, Katu, and Amla
c. Kashaya and Tikta
d. Madhura and Kashaya

29. What is the therapeutic indication of Kankushtha?
a. Hikka and Shvasa
b. Udavarta, Vrana, and Amavata
c. Pandu and Kamala
d. Jvara and Raktapitta

30. What is the dose recommended for Virechana Karma using Kankushtha?
a. 1 Ratti (125 mg) b. ½ Yava (15 mg)
c. 1 Yava (30 mg) d. 1 Karsha (12 g)

31. What is the primary natural source of Agnijara (Ambergris)?
a. Algae found in coastal waters
b. Digestive secretions of sperm whales
c. Mineral deposits in the ocean
d. Marine vegetation

32. Which of the following is NOT a synonym for Agnijara?
a. Sindhuphala b. Arnavodbhava
c. Valavagnimala d. Chandramani

33. What is the primary action (Karma of Agnijara according to Ayurvedic texts?
a. Shodhana and Snehana
b. Dipana and Pachana
c. Rasayana and Vrishya
d. Lekhana and Ropana

34. Which of the following is a characteristic property of Agnijara?
a. Guru and Shita
b. Ushna and Laghu
c. Madhura and Snigdha
d. Tikshna and Kapha Vardhaka

35. What is the therapeutic indication of Agnijara?
a. Jvara and Shvasa

b. Shula and Rakta Roga
c. Kamala and Pandu
d. Vrana and Durnama

36. What is the chemical composition of Girisindura?
a. HgCl b. HgO
c. HgS d. $HgSO_4$

37. What is a distinguishing property of high-quality Girisindura?
a. Granular and coarse texture
b. Blackish red color with a dull finish
c. Fine particulate form with a vibrant red or orange color
d. Low specific gravity and opaque appearance

38. How many types of Sindura are mentioned in the Rasa Jala Nidhi?
a. 1 b. 2
c. 3 d. 4

39. What is the primary therapeutic action of Girisindura according to Ayurvedic texts?
a. Balya and Rasayana
b. Tridosha Shamaka and Vrana Ropana
c. Virechana and Anulomana
d. Jvarahara and Stambhana

40. For what type of application is Girisindura primarily used?
a. Oral consumption
b. Nasal administration
c. External application
d. Intramuscular injection

41. What is the chemical name of Mriddara Shringa?
a. Lead monoxide (PbO)
b. Lead sulfate ($PbSO_4$)
c. Lead chloride ($PbCl_2$)
d. Lead carbonate ($PbCO_3$)

42. How is Mriddara Shringa primarily used in therapeutic applications?
a. As an oral medication
b. In nasal administration
c. For external application
d. In intramuscular injections

43. Which property makes Mriddara Shringa suitable for wound healing and skin disorders?
a. Ushna Virya
b. Vata-kaphahara and Shita Virya
c. Tikshna and Ushna Guna
d. Laghu and Ushna Guna

44. What distinguishes Sadala Mriddara Shringa from Nirdala Mriddara Shringa?
a. Sadala is white and lightweight; Nirdala is yellow and heavy.
b. Sadala has layers and a rough surface; Nirdala is without layers.
c. Sadala is soft; Nirdala is hard.
d. Sadala is granular; Nirdala is smooth.

45. What is the primary therapeutic indication for Mriddara Shringa?
a. Fever and cold disorders
b. Digestive issues and anaemia
c. Wound healing, fractures, and skin disorders
d. Respiratory and liver diseases

46. What are the primary components of Kamsya (bronze)?
a. Copper and zinc b. Copper and tin
c. Copper and iron d. Copper and silver

47. Which region is traditionally renowned for producing high-quality Kamsya?
a. Mount Abu b. Saurashtra
c. Gujarat d. Myanmar

48. What is the primary therapeutic action of Kamsya in Ayurveda?
a. Vata-pitta-kaphahara and Dipana
b. Wound healing and Tvak Ropana
c. Tridoshaghana and Lekhana
d. Keshya and Sandhanakara

49. What is the proper dosage of Kamsya Bhasma for therapeutic use?
a. 1-2 ratti (125-250 mg)
b. ½ - 1 ratti (62-125 mg)
c. 2-3 ratti (250-375 mg)
d. ¼ - ½ ratti (31-62 mg)

50. Which purification method involves the use of gomutra (cow urine)?
a. Heating with cow dung cakes
b. Heating and dipping in cow urine seven times
c. Trituration with Arka Dugdha
d. Heating in a gajaputa

51. What are the primary components of Pittala (brass)?
a. Copper and tin b. Copper and zinc
c. Copper and iron d. Copper and silver

52. What is the proper method for purifying Pittala according to traditional Rasashastra?
a. Dipping in kanji (fermented rice water) after heating
b. Immersing in nirgundi swarasa mixed with turmeric after heating
c. Washing with lemon juice and drying under the sun
d. Triturating with aloe vera juice and heating

53. Which characteristic indicates that Pittala is unsuitable for therapeutic use?
a. Yellowish color after heating and immersion
b. Retains its metallic luster after heating
c. Turns black like iron after being heated and immersed in kanji
d. Produces a resonant sound when struck

54. What is the standard dosage of Pittala Bhasma for therapeutic applications?
a. 2-3 ratti (250-375 mg)
b. ½ - 1 ratti (62-125 mg)
c. 1-2 ratti (125-250 mg)
d. ¼ - ½ ratti (31-62 mg)

55. Which therapeutic property is associated with Pittala Bhasma?
a. Ushna Virya and Vatahara
b. Shodhana, Lekhana, and Pittahara
c. Dipana and Kapha-Vatahara
d. Shita Virya and Raktashodhaka

56. What is Vartaloha primarily used for?
a. Jewelry making
b. Medical equipment manufacturing
c. Utensil production
d. Construction material

57. Which of the following metals is NOT part of the Vartaloha alloy composition?
a. Lead (Naga) b. Iron (Loha)
c. Gold (Svarna) d. Copper (Tamra)

58. What is the correct process for purifying Vartaloha?
a. Heating and dipping in Aja-Mutra or Haya-Mutra for seven cycles.
b. Washing with kanji and drying under sunlight
c. Triturating with aloe vera juice and incinerating
d. Mixing with haritaki churna and boiling

59. What is the therapeutic dose of Vartaloha Bhasma?
a. 1–2 ratti (125–250 mg)
b. ½–1 ratti (62–125 mg)
c. ¼–½ ratti (31–62 mg)
d. 2–3 ratti (250–375 mg)

60. Which therapeutic properties are associated with Vartaloha?
a. Dipana, Pachana, Krimighna, and Kapha-Pittahara
b. Raktashodhaka, Jvarahara, and Balya
c. Svedana, Stambhana, and Kapha-Vatahara
d. Vrishya, Rasayana, and Hrida

61. Which of the following is NOT a synonym of Manikya?
a. Ravi Ratna b. Padmarga
c. Svarnaratna d. Lohitam

62. What is the primary chemical composition of Manikya?
a. Calcium Carbonate b. Aluminium Oxide
c. Silicon Dioxide d. Magnesium Sulfate

63. Which quality is preferred for pharmaceutical use of Manikya?
a. Dull or non-brilliant appearance
b. Rough and uneven surface
c. Vibrant red hue akin to a red lotus petal
d. Smoky and unclear color

64. What is the correct process for purifying (Shodhana Manikya as per Method 01?
a. Heating in goat's urine for seven cycles
b. Svedana with Nimbu Svarasa for one Yama (3 hours)
c. Triturating with rose water for seven days
d. Boiling in citric acid for eight cycles

65. What are the therapeutic properties of properly prepared Manikya Bhasma?
a. Medhya, Dipana, Vrishya, and Kshaya Roga Nashana
b. Shothahara, Vranahara, and Raktashodhaka
c. Rasayana, Balya, and Tvak Shodhaka
d. Jvarahara, Stambhana, and Vatahara

66. What is the chemical composition of Emerald (Tarkshya)?
a. $Be_2Al_2(SiO_3)_6$ b. Al_2O_3
c. $CaCO_3$ d. SiO_2

67. What is the primary color responsible for the green coloration of Emerald?
a. Iron
b. Chromium or Vanadium
c. Copper
d. Manganese

68. Which of the following is a therapeutic indication for Emerald (Tarkshya)?
a. Insomnia b. Jvara (fever)
c. Headache d. Asthma

69. What is the typical process for purifying Tarkshya Emerald according to Ayurvedic texts?
a. Heat treatment with honey
b. Submersion in cow's milk using Dolayantra
c. Soaking in water overnight
d. Heating in a furnace

70. What is the primary therapeutic action of Tarkshya (Emerald)?
a. Improves digestion
b. Enhances strength and vitality
c. Reduces fever and balances Pitta
d. Alleviates joint pain

71. What is the chemical composition of Pushparaga (Topaz)?
a. Al_2O_3 b. SiO_2
c. $CaCO_3$ d. NaCl

72. Which of the following is NOT a synonym for Pushparaga (Topaz)?
a. Pushparaja b. Guru Ratna
c. Pitarakta d. Amethyst

73. What is the primary therapeutic indication for Pushparaga (Topaz) in Ayurveda?
a. Skin rejuvenation
b. Medhya (enhancing intellect)
c. Bone strengthening
d. Pain relief

74. What is the method used to purify Pushparaga (Topaz) in Ayurvedic texts?
a. Boiling in water
b. Mixing with honey
c. Swedana (steaming) with Kulattha Kvatha and Kanji
d. Incineration in fire

75. According to the text, what is the recommended dose of Pushparaga Pishti (powder)?
a. 1/4th – 1 Ratti b. 5 Ratti
c. 2 Ratti d. 10 mg

76. What is the chemical composition of Nilama (Sapphire)?
a. SiO_2 b. Al_2O_3
c. NaCl d. $CaCO_3$

77. Which of the following is a characteristic of Nilama (Sapphire) as per Ayurvedic texts?
a. Should be light and malleable
b. Must be crystal clear with a vibrant blue hue
c. Should be opaque and rough
d. Must have a combination of red and blue shades

78. In the purification process of Nilama (Sapphire), what is used as the medium for steaming the stone?
a. Honey b. Ghee
c. Nila Svarasa (herbal juice)
d. Water

79. What is the recommended dose of Nilama Pishti in Ayurveda?
a. 1/4th – 1 Ratti b. 1/8th – 1/2 Ratti
c. 1 – 2 Ratti d. 1/16th – 1/8th Ratti

80. Which therapeutic indication is NOT associated with Nilama (Sapphire)?
a. Kasa (Cough)
b. Guda Roga (Anorectal diseases)
c. Shvasa (Respiratory disorders)
d. Skin rejuvenation

81. What is the chemical composition of Gomeda (Zircon)?
a. ZrO_2 b. $ZrSiO_4$
c. SiO_2 d. NaCl

82. Which of the following is a key property of Gomeda (Zircon)?
a. It has a specific gravity of 2.65.
b. It is highly soluble in water.
c. It has a hardness of 7.5 on the Mohs scale.
d. It has a streak that is colored red.

83. Which of the following is the correct method for the purification (Shodhana of Gomeda?
a. Steaming in cow's urine for 1 hour.
b. Steaming with lemon juice using a Dolayantra for 3 hours.
c. Boiling in water for 5 hours.
d. Heating in a clay pot with ghee.

84. What are the primary therapeutic indications of Gomeda (Zircon)?
a. Cough and cold
b. Pandu Roga and Kshaya
c. Eye disorders
d. Skin diseases

85. Which of the following is the dosage range for Gomeda Pishti as mentioned in the text?
a. 1 Ratti – 5 Ratti b. 1/4th – 1 Ratti
c. 5 Ratti – 10 Ratti d. 1/2 Ratti – 2 Ratti

86. What is the chemical composition of Vaidurya (Cat's Eye)?
a. $BeAl_2O_4$ b. SiO_2
c. Al_2O_3 d. NaCl

87. What is the primary therapeutic indication of Vaidurya (Cat's Eye)?
a. Raktapitta b. Vata disorders
c. Skin diseases d. Kaphaja conditions

88. According to the Grahya Lakshana (qualities of a good Vaidurya), which of the following should be true about the gemstone?
a. It should have a dull appearance and light weight.
b. It should have a blackish-white hue and be heavy.
c. It should have a murky black coloration and coarse texture.
d. It should lack a bright sheen.

89. What is the prescribed dose of Vaidurya Pishti according to Rasa Tantra?
a. 1-2 Ratti
b. 1/4th – 1 Ratti (31-125 mg)
c. 2-3 Ratti d. 10-15 mg

90. What is the primary therapeutic action of Vaidurya (Cat's Eye) as mentioned in the text?
a. Reduces swelling and inflammation
b. Enhances memory, digestion, and removes toxins
c. Cures fractures and bone diseases
d. Promotes skin healing and anti-aging

91. What is the primary difference between antlers and horns?
a. Antlers are permanent, while horns are temporary.
b. Horns are branched, and antlers are solid.
c. Antlers are shed annually, while horns are permanent.
d. Antlers are found in both males and females, while horns are only found in males.

92. Which of the following is the correct chemical composition of Mriga Shringa (deer antler)?
a. $Ca_3(PO_4)_2$ b. $CaCO_3$
c. NaCl d. $MgSO_4$

93. Which therapeutic property is associated with Mriga Shringa (deer antler)?
a. It increases Kapha and Vata dosha
b. It is useful in treating conditions like Kasa, Shvasa, and Hridshula.
c. It promotes the growth of new antlers.
d. It is primarily used for hair growth.

94. Which of the following is a correct step in the preparation of Mrigashringa Bhasma?
a. The antler is boiled in water to remove impurities.
b. It is ground into a fine powder and mixed with Arka Dugdha.
c. It is left in open air to dry for a year.
d. The antler is first powdered and then mixed with Kumari Svarasa.

95. What is the recommended dosage of Mriga Shringa Bhasma?
a. 1 – 2 Ratti (125 – 250 mg)
b. 5 – 10 grams
c. 10 – 20 mg d. 1 – 2 grams

96. What is the chemical composition of Sikata (Silica)?
a. $CaCO_3$ b. SiO_2
c. NaCl d. $MgSO_4$

97. Which of the following is a characteristic property of Sikata (Silica)?
a. Metallic luster and dark silver-gray to bluish brown color
b. Transparent with a smooth surface
c. Soft with a hardness of 1-2
d. Yellowish color and brittle texture

98. What is the recommended dose of Sikata (Silica)?
a. 1 – 2 Ratti b. 3 – 6 Masha
c. 10 – 15 grams d. 1 – 2 grams

99. What is the primary therapeutic action of Sikata (Silica)?
a. It is used for enhancing digestion.
b. It acts as a Lekhana (scraping), Santhapana-shaka (stabilizing), and Shrama Nashaka (fatigue-reducing).
c. It promotes hair growth.
d. It helps in treating skin diseases.

100. Which of the following is an indication for the use of Sikata (Silica)?
a. Uroshata and Raktastivana
b. Urakshata and Raktastivana
c. Headache and joint pain
d. Digestive disorders

101. What is the chemical composition of Vyomashma (Jade)?
a. $Na(Al, Fe)Si_2O_6$ b. SiO_2
c. $CaCO_3$ d. K_2SO_4

102. Which of the following properties is true for Vyomashma (Jade)?
a. It has a soft texture and is an excellent conductor of heat.
b. It has a greasy luster and a splintery fracture.
c. It is transparent and brittle in nature.
d. It is highly conductive and used in electronics.

103. What is the recommended dose of Vyomashma (Jade) in its medicinal form?
a. 30 – 120 mg b. 120 – 480 mg
c. 500 – 1000 mg d. 1 – 2 grams

104. Which of the following therapeutic indications is Vyomashma (Jade) used for?
a. Heart disease and diabetes
b. Mutradaha, Shula, Ashmari, Pravahika, Raktapitta
c. Digestive disorders and fever
d. Skin diseases and wound healing

105. Which of the following is used as the purifying liquid during the Shodhana process of Vyomashma (Jade)?
a. Rose water (Gulaba Jala)
b. Honey
c. Aloe Vera gel
d. Coconut milk

106. What is the chemical composition of Kausheyashma (Asbestos)?
a. $Mg_3Si_2O_5(OH)_4$ b. SiO_2
c. $Na(Al_2Fe)Si_2O_6$ d. Al_2O_3

107. Which of the following is a characteristic property of Kousheyashma (Asbestos)?
a. It is an excellent conductor of heat.
b. It has a prismatic cleavage and fibrous fracture.
c. It is transparent and brittle.
d. It has a greasy luster and opaque streak.

108. What is the recommended dose of Kausheyashma (Asbestos) in its medicinal form?
a. 1 – 2 grams
b. 4 Ratti – 8 Ratti (500 – 1000 mg)
c. 10 – 15 mg
d. 5 – 10 grams

109. Which therapeutic indication is Kausheyashma (Asbestos) used for?
a. Digestive disorders and skin infections
b. Raktapitta, Pradara, Prameha, Dantapuya
c. Bone fractures and joint pain
d. Respiratory disorders and cough

110. What is the recommended Anupana (vehicle) for Kausheyashma (Asbestos) medicinal use?
a. Ghee
b. Honey, Water, Milk, Kadali Kanda Svarasa
c. Aloe vera juice
d. Lemon juice

111. What is the chemical composition of Badarashma (Silicate of Lime)?
a. Si_4CaO_4 b. $Mg_3Si_2O_5(OH)_4$
c. Na_2SO_4 d. $Ca_3(PO_4)_2$

112. Which of the following is a characteristic property of Badarashma?
a. Transparent with a vitreous luster
b. White or greyish color with perfect cleavage
c. Completely tasteless and translucent
d. Yellow with fibrous fracture

113. What is the therapeutic indication for using Badarashma (Silicate of Lime)?
a. Bone fractures and joint pain
b. Mutrashmari, Mutradaha, Mutrakrichchra, Mutraghata, Upadamsha
c. Digestive disorders and skin infections
d. Raktapitta and Prameha

114. What is the required dose of Badarashma in its medicinal form?
a. 2 Ratti – 4 Ratti (250 – 500 mg)
b. 4 Ratti – 8 Ratti (500 – 1000 mg)
c. 10 – 20 mg
d. 1 – 2 grams

115. Which of the following Anupanas (vehicles) can be used with Badarashma?
a. Ghee, Water, Milk, Kadali Kanda Svarasa
b. Honey, Water, Milk, Kadali Kanda Svarasa
c. Aloe vera juice, Water, Honey, Milk
d. Lemon juice, Milk, Water, Ghee

Answer Sheet

1.	B.	2.	B.	3.	B.	4.	B.	5.	A.	6.	B.	7.	A.	8.	B.
9.	B.	10.	B.	11.	B.	12.	B.	13.	B.	14.	A.	15.	A.	16.	B.
17.	A.	18.	A.	19.	A.	20.	D.	21.	B.	22.	D.	23.	D.	24.	B.
25.	C.	26.	B.	27.	B.	28.	B.	29.	B.	30.	C.	31.	B.	32.	A.
33.	B.	34.	B.	35.	B.	36.	B.	37.	C.	38.	B.	39.	B.	40.	D.
41.	A.	42.	C.	43.	B.	44.	B.	45.	C.	46.	B.	47.	B.	48.	C.
49.	B.	50.	B.	51.	B.	52.	B.	53.	C.	54.	B.	55.	B.	56.	C.
57.	C.	58.	A.	59.	B.	60.	A.	61.	C.	62.	B.	63.	C.	64.	B.
65.	A	66.	A.	67.	B.	68	B.	69.	B.	70.	C.	71.	A.	72.	D.
73.	B.	74.	C.	75.	A.	76.	B.	77.	B.	78.	C.	79.	B.	80.	D.
81.	B.	82.	C.	83.	B.	84.	B.	85.	B.	86.	A.	87.	A.	88.	B.
89.	B.	90.	B.	91.	C.	92.	A.	93.	B.	94.	B.	95.	A.	96.	B.
97.	A.	98.	B.	99.	B.	100.	B.	101.	A.	102.	B.	103.	B.	104.	B.
105.	A.	106.	A.	107.	B.	108.	B.	109.	B.	110.	B.	111.	A.	112.	B.
113.	B.	114.	B.	115.	B.										

Write Question Answer

1. List the probable chemical changes during the Marana process of Giri Sindura.
2. Mention the dose and properties of Kamsya Bhasma.
3. Discuss the synonyms, mineralogical identification, and sources of Vimala and Rasaka.
4. Explain the process of Shodhana and Marana of Tarkshya, including its probable chemical changes and final properties.
5. Elaborate on the toxic effects of Ashuddha or Apakva Bhasma of Vaikranta and the corresponding Ayurvedic Shantyupaya.
6. Compare the properties, therapeutic uses, and modern research updates on Nilama, Gomeda, and Pushparaga.

• • •

11

Sharkara Kalpana

• Lecture: 8 hours, non-lecture: 6 • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- Yes) •

Sharkara Kalpana

Introduction

- Sharkara Kalpana is a palatable liquid formulation in Ayurveda, closely resembling Sharbata in terms of its sweet, syrup-like consistency.
- Highly palatable and easy to administer, especially for children and individuals who prefer liquid medicines over solid forms.
- Requires no dissolution time, leading to faster absorption in the stomach and intestines compared to solid dosage forms.
- The high osmotic pressure of Sharkara (sucrose) helps prevent the growth of bacteria, fungi, and other microorganisms, enhancing its shelf life.
- Not originally mentioned in classical Ayurvedic texts, it was introduced to Ayurveda in the 20th century by Yadavaji Trikamaji.
- Widely utilized by Ayurvedic pharmaceutical companies, with many patent products available in syrup form.
- The optimal concentration of sugar in Sharkara Kalpana is approximately 66.7%, crucial for maintaining its consistency and preservation.

Definition

Sharkara Kalpana is an oral liquid dosage form, typically in the form of sweet, viscous syrups made from concentrated or saturated sucrose solutions.

General Method of Preparation

हिमे फाण्टे श्रृतेऽर्के वा शर्करां द्विगुणां क्षिपेत्।
मन्देऽग्नौ साधितं पूतं पटात् तत् शार्करं स्मृता।।

(Dravya G.Vi.U. 2/50 Shri Yadavji)

1. Start with any liquid Ayurvedic preparation such as Hima (cold infusion), Phanta (hot infusion), Arka (distillate), or Kwatha (decoction).
2. Add double the quantity of sugar to the base liquid.
3. Heat the mixture gently over a very mild fire, allowing it to simmer slowly until the liquid reaches a syrupy consistency similar to that of honey.
4. Once the desired consistency is achieved, filter the syrup to remove any impurities that may be present in the sugar.
5. Store the filtered syrup in clean, dry, and airtight bottles.

Difference between Sharkara Kalpana and Syrup

Sr. No.	Sharkara Kalpana	Syrup
1.	Prepare with herbal ingredients (herbal decoctions (Kvatha), infusions (Hima/Phanta), or distillates (Arka)) based on Ayurvedic principles.	Prepared with synthetic or natural active ingredients.
2.	Double the quantity of sugar is used.	Concentrated sugar or artificial sweeteners are used
3.	The liquid preparation is boiled gently with sugar until it reaches a syrupy consistency, followed by filtration and storage.	Syrups are often prepared by dissolving sugar in water or other solvents, and active ingredients are added without necessarily following traditional boiling methods.

Sr. No.	Sharkara Kalpana	Syrup
4.	Preserved naturally through the high osmotic pressure of sugar, which prevents microbial growth.	Requires additional preservatives or stabilizers (like citric acid or sodium benzoate) to extend shelf life.
5.	Viscosity is compatibly more.	Viscosity is compatibly less
6.	Alcoholic or hydro-alcoholic extracts are not used in the preparation process of Sharkara Kalpana.	Alcoholic and hydro-alcoholic extracts are commonly used as solvents or to extract active ingredients from plants, aiding in the formulation.

Importance of Temperature

1. Temperature plays a critical role in achieving the proper syrupy consistency (similar to honey) in Sharkara Kalpana. Heating the mixture at a mild, controlled temperature ensures that the sugar dissolves fully and the mixture thickens without caramelizing or burning the sugar.
2. Gentle heating preserves the medicinal properties of the herbal base (Kvatha, Phanta, Arka, etc.). Excessive heat may degrade the therapeutic compounds in the formulation, reducing its effectiveness.
3. Maintaining the correct temperature prevents the sugar from crystallizing prematurely. Proper syrup formation is achieved when the liquid is heated slowly and evenly, ensuring the sugar remains dissolved.
4. Controlled heating makes the preparation easier to filter by maintaining the right fluidity, allowing impurities to be removed efficiently.

Precautions

1. Use a very mild fire to avoid overheating and ensure proper syrup consistency.
2. Add the correct amount of sugar—excess sugar may settle as sediment, while too little sugar prevents proper syrup formation.
3. Boil the mixture until it reaches 1-2 thread consistency for optimal texture.

Confirmatory Tests

1. Take a small portion of the Sharkara Kalpana syrup that has been prepared.
2. Fill a clean, transparent bowl with enough clean water to fully submerge the syrup sample.
3. Carefully drop the portion of syrup into the bowl of water.
4. Observe the behavior of the syrup in the water:
   - **Expected Result:** The syrup should settle down as a distinct lump without spreading or dissolving into the water. This indicates that the syrup has attained the desired consistency.
   - **Unwanted Result:** If the syrup spreads or dissolves in the water, it suggests that the syrup may not have achieved the proper consistency, indicating potential issues with its formulation.
5. Based on the observation, confirm whether the Sharkara Kalpana meets the required standards for consistency and stability. If the syrup settles appropriately, it validates the quality of the preparation.

Packing

Store in Glass Bottles and keep the bottles in a cool, dark place where the temperature does not exceed 25°C.

Preservation

The concentrated form of Sharkara Kalpana is naturally preserved due to its high sugar content and does not require additional preservatives.

However, in the diluted form of Sharkara Kalpana, preservatives may be incorporated to ensure stability and extend shelf life.

Commonly used preservatives in modern formulations of Sharkara Kalpana include sodium benzoate, potassium metabisulfite, citric acid, glycerin, methyl paraben, and benzoic acid, which help prevent microbial growth and maintain the efficacy of the preparation.

Shelf Life

According to Gazzet of Governament of India 2016- 3 Years.

Example

1. Tulasi Arka Sharkara

Reference: Anubhuta

Ingredients Used:

Drug Name	Part Used	Proportion
Tulasi Arka	Leaf	1 Part
Sugar	–	2 Parts

Procedure

General Method of Preparation.

Dose: 5-10 ml

Therapeutic Indications: Shvasa, Kasa and Pratikshya.

Gudapaka

Introduction

- Guda Paka Kalpana refers to a specialized branch of Ayurvedic formulation techniques where Guda (jaggery) is the key ingredient.
- It is mentioned prominently in the Indian Pharmacopoeia under the heading "Guda Kalpana," signifying the importance of jaggery-based preparations in medicine.
- These confections primarily utilize Guda not only for its natural sweetness but also for its excellent binding properties, making it a versatile component in medicinal formulations.
- Guda is known for its nutritional value, ease of digestion, and ability to enhance the therapeutic potential of other herbs, making it a favoured ingredient in various preparations.
- When Guda (jaggery) is chosen as the sweetening agent in a formulation, its quantity is lower compared to Sharkara (sugar) due to its richer pharmacological properties and more concentrated form, allowing for a thicker Paka than that obtained with Sharkara.
- Old jaggery is beneficial for the heart (hridaya) and considered pathya (wholesome), while fresh jaggery increases kapha and weakens digestion (agni mandya).

Definition

Guda (jaggery) is heated until they reach a thick, semi-solid consistency (Avaleha). After achieving this consistency, specific herbal powders (Churnas) are mixed in, and the mixture is shaped into tablet-like forms known as Gudapaka Kalpana.

General Method of Preparation

लेहवत्साध्यते वह्नौ गुडो वा शर्करांथवा।
गुग्गुलुर्वा क्षिपेत्तत्र चूर्णं तन्निर्मिता वटी।। (Sha.S.M.Kh. 7/2)

1. Prepare a liquid base, such as Kashaya (decoction) or Svarasa (juice), following classical Ayurvedic references. Pour the liquid into a clean, large vessel and place it over a gentle flame.
2. Add the specified quantity of Guda (jaggery) to the liquid and allow it to dissolve completely. Once dissolved, the mixture can be filtered to remove any physical impurities.
3. Transfer the filtered liquid into a clean, wide-mouthed stainless steel vessel and heat it on a mild flame, reducing the mixture until it reaches a consistency where 2 to 3 threads can be formed when tested.
4. Remove the vessel from the heat, and slowly add fine powder of medicinal herbs, stirring continuously to ensure a uniform, homogeneous blend.
5. Once the mixture has cooled completely, add honey, if specified, and mix thoroughly.
6. The final product is packed into dry, airtight, wide-mouthed containers for preservation.

Importance of Temperature

- Mild heat is required to dissolve Guda (jaggery) completely into the liquid preparation without burning or caramelizing it. Excessive heat can degrade the quality of Guda, reducing its therapeutic properties.
- Achieving the correct consistency, especially the "2 to 3 thread" stage, requires careful temperature regulation. If the temperature is too high, the mixture may become too hard or burn; too low, and the Paka may remain undercooked or too thin.
- Maintaining moderate heat helps in the uniform mixing of medicinal powders into the Guda-based blend. Sudden changes in temperature may cause uneven distribution, affecting the efficacy of the final product.
- Proper temperature control ensures the medicinal properties are preserved and that the final product has a stable shelf life.
- Precise heat management ensures the desired form and texture are achieved.

Precautions

1. Use high-quality, clean, and aged Guda (jaggery), as fresh jaggery may cause Kapha aggravation and impair digestion.

2. Ensure that the medicinal herbs and other ingredients are pure and free from contaminants.
3. Use mild to moderate heat to dissolve the Guda and prepare the mixture. Overheating can lead to caramelization or burning, while underheating may result in improper consistency.
4. Constantly monitor the temperature, especially when reducing the blend to the desired thread consistency.
5. After dissolving the Guda, filter the mixture to remove any physical impurities or foreign particles. This step ensures the final preparation is clean and free from unwanted materials.
6. Stir the mixture continuously while adding the medicinal powders to ensure a smooth, homogeneous blend. Avoid lump formation by adding the powders gradually and uniformly.
7. Maintain cleanliness throughout the process, including using clean utensils and working in a hygienic environment to prevent contamination.

Confirmatory Tests

यदा दर्वीप्रलेपः स्यात् यदा वा तन्तुली भवेत्।
तोयपूर्णे च पात्रे तु क्षिप्तो न प्लवते गुडः।।
क्षिप्तस्तु निश्चलस्तिष्ठेत् पतितस्तु न शीर्यति।
एष पाको गुडादीनां सर्वेषां परिकीर्तितः।।
सुख मर्दः सुखस्पर्शो गन्धवर्णरसान्वितः।
पीडितो भजते मुद्गां गुडः पाकमुपागतः।। (V.P. Pra. 3/50-52)

1. Pakakalina (During Cooking)

- **Adherence to Spoon**: While stirring the preparation, the Paka material sticks strongly to the spoon, indicating that the mixture is reaching the desired consistency.
- **Thread Consistency**: The Paka material should attain a 2-3 thread consistency when checked by stretching the mixture between the fingers or spoon.
- **Water Test**: If a small piece of the Paka material is dropped into a bowl of stable water, it should settle at the bottom without dispersing, confirming the proper thickness.
- **Soft and Sticky Texture**: The mixture remains soft and sticky to the touch, a sign of the desired semi-solid consistency.

2. Pakanantara (Post-Cooking)

- **Appearance:** The preparation should exhibit the desired color, aroma, and taste as per the ingredients used, indicating that the Paka has been prepared correctly.
- **Fingerprint Test:** When touched, the Paka material should allow clear fingerprint impressions, showing it is still soft yet firm enough for shaping or storage.

Packing

Store the final preparation in dry, airtight containers to avoid contamination and moisture, which can degrade the product's quality over time.

Preservation

The concentrated form of Gudapaka Kalpana is naturally preserved due to its high sugar content and does not require additional preservatives. Commonly used preservatives in modern formulations include sodium benzoate, potassium meta bisulfite, citric acid, glycerin, methyl paraben, and benzoic acid, which help prevent microbial growth and maintain the efficacy of the preparation.

Dose

12 gms

Anupana

Godugdha, Jala or any liquid preparation.

Shelf life

3 Years

Example

1. Manibhadra Guda

Reference: AFI, Part- 01

विडङ्गसारामलकाभयानां पलत्रयं त्रीणि पलानि कुम्भात्।
गुडस्य च द्वादश मासमेष जितात्मनां हन्त्युपयुज्यमानः।।
कुष्ठं श्वित्रं श्वासकासोदरार्शोमेहप्लीहग्रन्थ्यरुग्जन्तुगुल्मान्।
सिद्धं योगं प्राह यक्षो मुमुक्षोर्भिक्षोः प्राणान्माणिभद्रः किलेमम्।।
(A.Hr.Chi. 19/31-32)

Ingredients Used

Drug Name	Part Used	Proportion
Vidanga	Fr.	48 gms
Amalaki	P.	48 gms
Haritaki	P.	48 gms
Trivrta	Rt.	144 gms
Guda	–	576 gms

Procedure

1. Begin by finely powdering the herbs (drugs 1 to 4) until they reach a smooth consistency.
2. In a clean vessel, combine Guda (jaggery) with water and heat gently. Boil the mixture until it thickens into a Lehyapaka with a 2-3 thread consistency.
3. Gradually add the powdered herbs to the Lehyapaka and mix thoroughly, ensuring the blend becomes a uniform, homogeneous mass.
4. Shape the mixture into Modakas (small pills) of the desired size, then allow them to dry in the shade. Once dried, store the Modakas in airtight glass containers to preserve their potency and freshness.

Dose: 6 gms

Anupana: Water, Milk

Therapeutic Indications: Kustha, Shvitra, Udara, Pliha, Krimi, Granthiruk, Arsha, Shvasa, Kasa, Meha, Gulma.

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Critical Review of Manibhadra Yoga	Vd. Tejaswi Raut PG Scholar, Department of Rasashastra and Bhaishjyakalpana, Government Ayurved College Nagpur, 440009.	Manibhadra Yoga, widely used in clinical practice, varies in Guda quantity across texts and is primarily used for kushtha and arsha chikitsa, acting as a sukhvirechaka. Different preparation methods, agni sidha and anagnisiddha, result in varied shapes and dosages of the final product. While Guda is typically in 6 or 12 parts, the final drug shape varies from Modak to Vatak, Gutika, Leha, and Guda. The market version, Manibhadra leham, is available in avaleha form.
2.	Pharmacognostical and Preliminary Physicochemical Evaluation of Manibhadra Guda – A Polyherbal Ayurvedic Formulation	Nilesh L. Patel, Ph.D. Scholar, Department of Panchkarma, Institute for Post Graduate Teaching and Research in Ayurveda, Gujarat Ayurved University, Jamnagar, Gujarat, India.	The study results indicate that the test formulation exhibited significant physicochemical parameters: water-soluble extractive (66.80% w/w), alcohol-soluble extractive (57.10% w/w), ash value (3.00% w/w), loss on drying (12.52% w/w), and pH (3.5 in 5% aqueous solution). High-performance thin-layer chromatography identified ten peaks at 254 nm and thirteen peaks at 366 nm, establishing a standard reference for future research.
3.	Role of Manibhadra Guda in the Management of Nonspecific Mesenteric Lymphadinitis in Children: A Review	Ramesh G. Halalli, P.G. Scholar, Department of P.G. Studies in Kaumarabhritya, Alva's Ayurveda Medical College, Moodbidri, India	Enlarged mesenteric lymph nodes are more common in males aged 5 to 10 years, presenting as chronic abdominal pain. Ayurvedic parallels with Gulma suggest involvement of Vata dosha, Raktasudha, and Vedhana. Hence, Manibhadra Guda may effectively manage this condition.
4.	Pharmaceutical Analysis of Manibhadra Yoga Prepared With Different Methods	Pravin Ramdas Firke, Associate Professor, & HOD Department of Agadtantra, Krishna Ayurved Medical College, Vadodara, Gujarat, India	Manibhadra Yoga, an economical formulation, utilizes easily accessible ingredients with low production costs. However, during preparation, Sample A was rejected for forming a hard mass, Sample B (Leha form) degraded quickly due to high moisture content, and Sample C (Modaka) was too hard and large. To address these issues and ensure ease of administration and longer shelf life, Gudapaka was transformed into granules (Sample D). This process proved less labor-intensive, resulting in a visually appealing and palatable product with lower moisture content, higher water-soluble extractives, and reducing sugars.

2. Guda Pippali

Reference: B.R. Pleehaykrt Rogaadhikara

पलैकं गुडमादाय पिप्पली च तथैव च।
हिङ्गुत्रिकटुकादीनां सैन्धवानां द्विमाषिकम्।।
चित्रकं च विडं चैव द्वौ क्षारौ शिखरीं तथा।
तालुपुष्पं कोकिलाक्षं चिञ्चाक्षारं सफेनकम्।।
स्नुहीक्षीरसमायुक्तं प्लीहज्वरविनाशनम्।।
(B.R. Pliha 41/50-51)

Ingredients Used

Drug Name	Part Used	Proportion
Guda	–	50 gms
Pippali	Fr.	50 gms
Suddha Hingu	Exd.	2 gms
Sunthi	Rz.	2 gms
Pippali	Fr.	2 gms
Marica	Fr.	2 gms
Saindhav	–	2 gms
Chitraka	Rt.	2 gms
Vida Lavana	–	2 gms
Yava kshara	–	2 gms
Saji kshara	–	2 gms
Apamarga	Pt.	2 gms

Drug Name	Part Used	Proportion
Tala Pushpa	Fl.	2 gms
Kokilaksh	–	2 gms
Cinca Kshara	–	2 gms
Samudraphena	–	2 gms
Snuhi Kshira	L.	2 gms

Procedure

1. Finely powder the herbs, including Pippali to Snuhi Kshira.
2. Place the powdered herbs and Guda (jaggery) together in a Khalva Yantra (mortar and pestle).
3. Pound the combination thoroughly until it reaches a smooth, soft consistency.
4. Once the desired texture is achieved, shape the mixture into Modakas (small pills) of your preferred size.

Dose: 1- 2 gms (Vati Form)

Anupana: Water

Therapeutic Indications: Pliha Jvara.

Research updates: No Data Found.

Lavana Kalpana

Introduction

- Lavana, commonly known as salt, plays a significant role in both culinary practices and medicinal uses.
- **लुनाति इति लवणः,** (Shabdakalpadruma) where 'lunati' means 'chhedana', so that which possesses' chhedana property' in it is called as 'lavana'.
- It is an essential dietary element not only for humans but also for animals and many plant species. In Ayurveda, Lavana is one of the six tastes (Shadrasa).
- Regarding its Panchabhautika composition, Acharya Charaka attributes it to the elements of Jala (water) and Agni (fire), while Acharya Sushruta describes it as a combination of Prithvi (earth) and Agni (fire).

Definition

Lavana Kalpana refers to a pharmaceutical preparation in which 'lavana' (salt) and a selected 'aushadha dravya' (medicinal substance) are combined and subjected to ignition together in a closed sampuna (container). This process results in the formation of a medicinal ash, which is used as a therapeutic product in medicine.

General Method of Preparation

a. Lehapaka Vidhi in Lavana Kalpana:

1. Start by preparing a decoction using the selected medicinal herbs. Boil the herbs in water until the desired concentration of the decoction is achieved.
2. Once the decoction is prepared, reheat it on fire and add the required amount of Lavana (salt) to the boiling decoction. Continue heating the mixture until it reaches a concentrated form.
3. After achieving the required concentration of the decoction, remove it from the heat. Gradually add the powdered form of the other selected drugs to the mixture.
4. Stir the mixture thoroughly to ensure the powdered drugs are well combined with the concentrated decoction and Lavana. Continue mixing until a uniform preparation is obtained.
5. Allow the mixture to cool down naturally. The end product is a stable Lavana Kalpa, ready for therapeutic use.

Example: This method is used to prepare formulations like Abhaya Lavana.

b. Procedure for Putapaka Vidhi in Lavana Kalpana

1. Select the raw drugs and the required amount of Lavana (salt). Mix them together thoroughly.
2. Place the mixture of raw drugs and Lavana into an earthen vessel called Sharava.
3. Cover the filled Sharava with another Sharava, placed upside down. Seal the junction where the two Sharavas meet using Matkapada (cloth smeared with clay) to ensure the container is tightly closed and no air escapes.
4. Once sealed, subject the Sharavas to Puta, which involves heating them using cow dung cakes as fuel. The duration and intensity of the heating process should be carefully monitored to ensure complete combustion and transformation of the mixture.
5. Allow the Sharavas to cool down naturally after the heating process is complete. Once cooled, carefully break open the sealed Sharavas.
6. Collect the formed Lavana Kalpa from the vessel, which is now ready for use as a medicinal product.

Example: This method is used to prepare formulations like Arka Lavana.

Importance of Temperature

1. **Facilitates Chemical Transformation**: Appropriate heating ensures that the Lavana (salt) and medicinal substances undergo the necessary chemical reactions. The application of the correct temperature enables the formation of the desired therapeutic compounds, such as the transformation of salt into its medicinally active form.
2. **Achieves Uniform Mixing**: In methods like Lehapaka Vidhi, maintaining the right temperature helps in reducing the decoction, allowing for the uniform blending of the Lavana with other medicinal ingredients. Proper heat ensures that the decoction reaches the right consistency, crucial for the final product's stability.
3. **Promotes Purification**: Heating in closed Sharava containers in Putapaka Vidhi facilitates the removal of impurities from both the Lavana and raw drugs. The controlled heat eliminates unwanted elements while preserving the medicinal properties of the ingredients.
4. **Prevents Decomposition**: Managing temperature during the heating process is vital to avoid overcooking or burning the medicinal ingredients. Excessive heat can degrade the active compounds, reducing the therapeutic efficacy of the final Lavana Kalpa.
5. **Enhances Stability and Shelf Life**: Proper heating at regulated temperatures ensures that the final product is stable and has a longer shelf life. When prepared under optimal temperature conditions, Lavana Kalpas resist microbial growth and maintain their potency over time.
6. **Ensures Consistency**: The application of controlled heat allows for the consistency of the final product in terms of taste, texture, and chemical composition, ensuring uniformity across different batches of preparation.

Precautions

1. Ensure that the Lavana (salt) used is pure and free from impurities.
2. Select medicinal herbs or raw drugs that are fresh, free from contamination, and of good quality to maintain the efficacy of the preparation.
3. In Putapaka Vidhi, make sure the junction between the two Sharavas is tightly sealed with Matkapada (clay-smeared cloth) to prevent air leakage. This ensures the process remains anaerobic, which is essential for the proper transformation of ingredients.
4. Ensure appropriate heat is applied during the heating process. Excessive heat can degrade the medicinal components, while insufficient heat can lead to incomplete processing.
5. In Puta (heating with cow dung cakes), monitor the fire intensity to avoid under or over-processing.
6. Overheating can cause the salt to decompose or burn the medicinal drugs, reducing the quality and effectiveness of the Lavana Kalpa. It's essential to maintain an optimal temperature throughout the process.
7. During and after preparation, protect the materials and final product from moisture to prevent the degradation of the Lavana Kalpa. This also helps to avoid microbial contamination.
8. The product should be stored in a clean, dry, airtight container to maintain its potency and prevent spoilage.

Confirmatory Tests

According to Rasa Tarangini- Kajjalvarna.

Packing & Preservation

Store the final preparation in dry, airtight containers to avoid contamination and moisture, which can degrade the product's quality over time.

Shelf life

5 Years

Example

1. Narikela Lavana

Reference: B.R. Shula Rogaadhikara.

नारिकेलं सतोयञ्च लवणेन प्रपूरितम्।
मृदाऽववेष्टितं शुष्कं पक्वं गोमयवह्निना।।
पिप्पल्या भक्षितं हन्ति शूलं च परिणामजम्।
वातिकं पैत्तिकञ्चापि श्लैष्मिकं सान्निपातिकम्।।

(B.R., Shula 30/69-70)

Ingredients Used

Drug Name	Part Used	Proportion
Nariyala with water	–	1 in nos. (250 gms)
Saindhava	–	125 gms

Procedure

1. Take a mature coconut, ensuring it is devoid of its outer fibrous part.
2. Make a small hole in one of the eyes of the coconut. Fill it completely with roughly 125 grams of powdered Saindhava Lavana (rock salt) until it reaches the brim.
3. Plug the hole securely using either a mud cork or a piece of chalk to prevent any leakage.
4. Wrap the entire coconut with three layers of cloth smeared with clay. Ensure that the layers are evenly applied for proper insulation.
5. Allow the clay-coated coconut to dry completely, ensuring it is firm and ready for heating.
6. Once dried, place the coconut in a puta (traditional Ayurvedic heating process) using 10-15 cow dung cakes as fuel. Allow it to heat until the combustion process is complete.
7. After the heating is done, let the coconut cool down naturally. Once cooled, carefully break open the coconut.
8. Collect the charred kernel and the residual salt together. Grind them into a fine powder.
9. Preserve the final product, which is an odorless, saline-tasting fine powder, in an airtight container.

Dose: 1-2 gms

Anupana: Pippali Churna, Warm Water.

Therapeutic Indications: All type of Parinama Shula.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Characterisation of Narikela Lavana	Dr. Shailendra Yadav Assistant Professor, Department of Rasa-Shastra and Bhaishajya Kalpana, SNK Ayurvedic Medical College and RKMS Charitable Hospital, Aligarh, Uttar Pradesh, India.	Narikela lavana, utilized since the 11th century and extensively elaborated by Acharya Sadananda Sharma in Rasa Tarangini, is a nanocrystalline material composed of activated carbon and elements like Na, K, Cl, and Mg. Its porous activated charcoal surface carries a negative charge that attracts positively charged toxins and gases, aiding in their removal and facilitating the swift elimination of unwanted bacteria from the digestive tract. Highly alkaline in nature, Narikela lavana shows promise in effectively treating hyperacidity (amlapitta) and peptic ulcers (Parinaam shool).
2.	A Review – Narikel Lavan	Dr. Sudeeksha, M.D scholar, Dept of Ras shastra and Bhaishjya Kalpana Rajiv Gandhi Govt post Graduate Ayurvedic College Paprola (H.P)	Narikel Lavan is recommended in the Rogadhikara of Parinaama Shula. Both methods of obtaining Narikel Lavan yield similar physicochemical properties, with XRF analysis revealing higher elemental Calcium content in Nirjala Narikel Lavan compared to Sajala Narikel Lavana. Ayurvedic Pharmaceutics holds immense potential in healing, with Narikel Lavan being an easy-to-prepare, palatable, and cost-effective remedy.

Kshara Kalpana

Introduction

Kshara Kalpana is a significant Ayurvedic preparation, focusing on the creation of alkaline substances from plant drug ashes.

These substances are used in various treatments due to their caustic and tissue-dissolving properties, particularly for removing or mobilizing deformed tissues.

Definition

Kshara is an alkaline substance derived from the ash of medicinal plants.The term comes from "Ksharana," meaning to dissolve or remove, especially abnormal tissues like mamsa (muscle) and dhatus (tissues).

It is defined as **"क्षरति इति क्षार:"** – that which dissolves or breaks down tissues.

General Method of Preparation

क्षारवृक्षस्य काष्ठानि शुष्काण्यग्नी प्रदीपयेत्।
नीत्वा तद्भस्म मृत्पात्रे क्षिप्त्वा नीरे चतुर्गुणे।।
विमर्थं धारयेदात्री प्रातरच्छं जलं नयेत्।
तन्त्रीरं क्वाथयेद् वलीयावत्सर्वं विशुष्यति।।
ततः पात्रात्समुल्लिख्य क्षारों ग्राह्यः सितप्रभः।।

(Sha.S.M.Kh. 11/102-103)

1. Select dried parts of specific trees that exude milky sap (latex).
2. Burn the dried plant material in fire to obtain its ash.
3. Take the obtained ash and dissolve it in four times the quantity of water in a clean mud pot.
4. Allow the mixture to settle overnight.
5. The next morning, carefully decant the clear supernatant liquid into a separate clean vessel, leaving the sediment behind.
6. Boil the decanted liquid until all the water evaporates, leaving behind a fine white powder at the bottom of the vessel.
7. Collect this fine white powder, which is now known as Kshara, for medicinal use.

NOTE : Note: According to Yadavji Trikamji- Six times water taken for the preparation of Kshara Kalpana.

Importance of Temperature

1. **Controlled Burning:** Appropriate temperature during combustion ensures complete ash formation, maximizing the potency of Kshara.
2. **Water Evaporation:** Regulating temperature during boiling prevents degradation of alkaline properties and ensures complete evaporation without burning.
3. **Consistency and Purity:** Correct temperature control helps achieve a uniform, fine white powder, minimizing impurities.
4. **Preservation of Medicinal Properties:** Proper temperature maintains bioactive components, ensuring Kshara retains its therapeutic effects.
5. **Optimal Therapeutic Efficacy:** Accurate temperature regulation ensures the final product is effective for its intended uses, such as tissue removal and detoxification.

Precautions

1. Use only specific dried parts of trees known to exude milky sap. Ensure they are free from contaminants or toxins.
2. Burn the plant material at an appropriate temperature to avoid incomplete combustion and ensure the formation of pure ash.
3. Use clean, filtered water for dissolving ash to prevent impurities from affecting the Kshara preparation.
4. Utilize a clean mud pot for dissolving the ash, as metal containers may react with alkaline substances.
5. During the boiling process, monitor the temperature to prevent burning the Kshara, which can degrade its medicinal properties.
6. Allow sufficient settling time for impurities to separate from the supernatant liquid before decanting.
7. Store the final Kshara in a cool, dry place in an airtight container to maintain its potency and prevent moisture absorption.

Confirmatory Tests

1. Kshara should have an alkaline pH, typically above 7.
2. Kshara should dissolve completely, indicating it has the required alkaline properties.
3. Heat a small amount of Kshara in a flame. The presence of specific elements can be indicated by the color of the flame. For instance, sodium gives a yellow flame, indicating the presence of alkaline substances.
4. Kshara should have a mild, non-offensive odor, characteristic of its source materials.
5. Kshara should have an alkaline or slightly bitter taste, confirming its active properties.
6. Kshara should neutralize acids, producing effervescence, indicating its alkaline nature.

Packing & Preservation

Store the final preparation in dry, airtight containers to avoid contamination and moisture, which can degrade the product's quality over time.

Shelf life

2 Years

Example

1. Kadali Kshara

Reference: AFI Part - 01, Sushruta Samhita, Sutrasthana, Adhyaya- 11/11.

Ingredients Used

Drug Name	Part Used	Proportion
Kadali Bhasma	Rz.	1 Part
Water	–	6 Parts

Procedure: General Method of Preparation.

Dose: 125 – 250 mg

Anupana: Water

Therapeutic Indications: Gulma, Pliha Roga, Jirna jvara, Garavisha, Visuchika, Alasaka, Aruchi, Ajirna, Anaha, Sharkara, Visha, Arsha, Anta. virdradhi.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pharmaceutico-Analytical Evaluation of Kadalikanda Paneeya Kshara	C H Arun, PG Scholar, Department of Rasashastra and Bhaishajya Kalpana, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, karnataka, India	This study aimed to standardize the preparation of Kadalikanda Kshara using the classical Rasatarangini method. The pharmaceutical process, differing in water-to-ash ratio, soaking time, and filtration, yielded 64g of white powder (37.20% yield), confirming alkalinity. Analysis detected trace elements like sodium, potassium, chloride, and carbonate, supporting the formulation's quality. These findings establish preliminary standards for Kadali kanda Kshara.Top of Form
2.	Effecacy of Kadali Kshara Sutra in the Management of Bhagandara (Fistula-In-Ano) - A Case Report	Dr. Shilpa PatilPost Graduate Scholar, Department of PG Studies in Shalya Tantra, N. K. Jabshetty Ay	Marked symptom reduction in pain, irritation, inflammation, burning sensation, and local reactions was observed in the treated group versus the control. This method resolves availability and collection issues, making Kshara Sutra therapy economical and easier. No recurrences were reported in the last 6 months, indicating Kadali Kshara Sutra as a preferable alternative to Apamarga Kshara Sutra due to higher acceptability and availability.

2. Chincha Kshara

Reference: Sharngadhara Samhita 11/102-104

Ingredients Used

Drug Name	Part Used	Proportion
Chincha	P.	1 Part
Water	–	4 Parts

Procedure: General Method of Preparation.

Dose: 125- 250mg

Therapeutic Indications: Agnimandya, Gulma, Shula, Mutra-Ashmari.

Research updates

Sr. No.	Article Name	Author Name	Result
1.	Analytical Study of Chincha Kshara Through Modern Parameters Like XRD, SEM and EDS	Dr. R. K. Rugmini BAMS; PG Scholar, Department of Rasa Shastra and Bhaishajya Kalpana, S. V. Ayurvedic College, Tirupati - 517501, Andhra Pradesh, India	The substance is a soft, fine white powder with a characteristic odor and a salty taste. It has a pH value of 13, indicating its highly alkaline nature. XRD analysis revealed its crystalline nature, predominantly comprising Potassium carbonate hydrate (K_2CO_3 (H_2O) 1.5). SEM micrographs depicted its amorphous nature and porous morphology, with particles adhered together as agglomerates.

Ayskriti Kalpana

Etymology

- Ayas: Means iron (Fe).
- Kati: Means to cut or hack.
- "Loha" initially referred to various metals, later specified to iron.
- The category "loha varga" was redefined as "dhatu varga."

Definition

Ayaskati is a procedure that transforms metals like iron, gold, and silver into smaller, manageable pieces for therapeutic use.

General Method of Preparation

तीक्ष्णलोहपत्राणि तनूनि लवणवर्गप्रदिग्धानि गोमयाग्निप्रतप्तानि त्रिफलाशालसारादिकषायेण निर्वापयेत् षोडशवारान्, ततः खदिराङ्गारतप्तान्युपशान्तितापानि सूक्ष्मचूर्णानि कारयेद्घनतान्-वपरिस्राविताानि, ततो यथाबलं मात्रां सर्पिर्मधुभ्यां संसृज्योपयुञ्जीत, जीर्णे यथाव्याध्यनम्लमलवणम् आहारं कुर्वीत, एवं तुलामुपयुज्य कुष्ठमेहमेदःश्वयथुपाण्डुरोगोन्मादापस्मारान् अपहत्य, वर्षशतं जीवति, तुलायां तुलायां वर्षशतमुत्कर्षः, एतेन सर्वलौहेषु अयस्कृतयो व्याख्याताः॥ (Su.Chi. 10/11)

1. Take thin sheets of Tikshna Lauha (sharp iron).
2. Smear the sheets with a solution of Pancha Lavana (five salts).

3. Heat the smeared sheets red-hot using the heat produced by dry cow dung cakes.
4. Dip the red-hot foils in Triphala Kvatha and Salasaradi Gana dravya kashaya, performing this dipping process 16 times for each.
5. Heat the foils in the fire produced by Khadira Kashtha (Acacia wood) and allow them to remain in the fire until it extinguishes naturally.
6. Collect the treated foils and finely powder them using a Khalva Yantra (stone grinder).
7. Administer the powdered Tikshna Lauha mixed with ghee and honey in the required quantity.
8. Advise the person to follow a pathya ahara (suitable diet) during the administration of the drug.

Dose

5 gunja (approximately 625 mg) to 1 masha (approximately 750 mg)

Therapeutic Indication

Kushtha (skin diseases), Prameha (diabetes), Medoroga (obesity), Shvayathu (edema), Pandu (anaemia), Unmada (mental disorders), and Apasmara (epilepsy).

Importance of Temperature

1. **Proper Metal Processing**: The preparation of metals like iron in Ayaskati requires specific heating methods to purify, detoxify, and make the metals bioavailable. Correct temperature helps in:
   - Breaking down impurities (removing toxins).
   - Enhancing the properties of metals through processes like Marana (incineration), ensuring they become suitable for therapeutic use.
2. **Enhancing Bioavailability**
   - Metals need to be heated to a certain degree so they can be finely processed into bhasma or other forms, which the body can assimilate. The precise temperature ensures that the metals are broken down into fine particles, enhancing their therapeutic absorption.
3. **Siddhi Lakshana (Signs of Completion)**
   - Just like in Avaleha and other formulations, there are signs that indicate the successful completion of the heating process in Ayaskriti. These signs appear at specific temperatures:
   - Correct consistency and texture of the metal mixture.
   - Desired color change or metallic sheen.
   - These transformations depend on achieving and maintaining the right temperature during preparation.
4. **Avoiding Overheating or Underheating**
   - If the temperature is too high, it can lead to:
   - Over-reduction of metal, resulting in loss of efficacy.
   - Charring or degradation of herbal ingredients added to the formulation.
   - If the temperature is too low, it may result in incomplete purification, poor assimilation, and reduced therapeutic value.
5. **Maintaining Therapeutic Integrity**
   - Each stage of metal processing in Ayaskriti requires specific temperatures to:
   - Ensure the metals maintain their medicinal properties.
   - Avoid unwanted chemical reactions that could create undesirable compounds.

Precautions

1. Ensure high-quality iron sheets and proper thickness for uniform processing.
2. Use the correct proportion of Pancha Lavana and prepare in a clean environment.
3. Heat with dry cow dung cakes in a well-ventilated area, monitoring temperature closely.
4. Dip red-hot sheets in properly prepared Triphala Kvatha and Salasaradi Gana Kashaya 16 times, maintaining correct decoction temperature.
5. Heat with Khadira wood and allow natural cooling after the fire extinguishers.
6. Finely powder the treated iron using a clean Khalva Yantra and wear protective gear.

Confirmatory Tests

Powder- Fine and smooth.

Packing & Preservation

Store the final preparation in dry, airtight containers to avoid contamination and moisture, which can degrade the product's quality over time.

Shelf life

5 Years

Example

1. Ayaskriti

Reference: Ashtanga Hridaya Chikitsa 12/29-33

साधयेद् असनादीनां पलानां विंशतिं पृथक्।
द्विद्रोणेऽपां क्षिपेत्तत्र पादस्थे द्वे शते गुडात्।।
क्षौद्राढकार्धं पलिकं वत्सकादिं च कल्कितम्।
तत् क्षौद्रपिप्पलीचूर्णप्रदिग्धे घृतभाजने।
स्थितं दृढे जतुसुते यवराशौ निधापयेत्।
खदिराङ्गारतप्तानि बहुशोऽत्र निमज्जयेत्।
तनूनि तीक्ष्णलोहस्य पत्राण्यालोहसङ्क्षयात्।
अयस्कृतिः स्थिता पीता पूर्वस्मादधिका गुणैः।।
रूक्षमुद्धर्तनं गाढं व्यायामो निशि जागरः।

(A.Hr.Chi. 12/29-33)

Ingredients Used

Drug Name	Proportion
Asanadi Gana Dravya	20 Pala each
Jala	2 Drona
Reduced to	1/4th
Guda	200 Pala
Madhu	Half Adhaka
Vatsakadi Gana Dravya	1 Pala each

1. Take the Asanadi Gana dravya (herbs) and prepare a coarse powder.
2. Add the coarse powder to the prescribed quantity of water.
3. Boil the mixture over a mild fire until the liquid is reduced to one-fourth of its original volume.
4. Filter the decoction while it is still warm.
5. Before the filtrate cools completely, add the required quantity of jaggery and dissolve it by continuous stirring.
6. Optionally, filter the mixture again after the jaggery has fully dissolved.
7. Take a mud pot that has been fumigated (dhupita) and smeared inside with ghee, honey, and pippali churna (long pepper powder).
8. Add the remaining drugs, including madhu (honey) and Vatsakadi Gana dravya churna, into the pot.
9. Stir carefully, ensuring the pot remains undamaged.
10. Apply a thick coat of jatu (lac) on the outer surface of the pot to seal it securely.
11. Place the sealed pot upright in a heap of yava (barley).
12. Heat thin sheets of Tikshna Lauha (sharp/magnetic iron) until they are red hot using the fire of khadira wood.
13. Dip the red-hot iron sheets into the liquid inside the pot.
14. Repeat this process several times until the entire iron sheet is depleted into the liquid.
15. Once the iron is fully incorporated, seal the mouth of the pot securely.
16. Leave the sealed pot undisturbed for a fortnight.
17. This preparation results in Ayaskriti.

Lepa Kalpana

Introduction

- Lepa Kalpana refers to topical preparations designed for external application on the skin or mucosal membrane.
- These medicaments are composed of one or more drugs, which are finely powdered and then mixed with a specified liquid medium to create a paste suitable for external use.
- Lepa preparations are particularly valued for their effectiveness in vrana-shodhana (cleansing wounds) and vrana-ropana (healing wounds).
- The various forms of topical applications include Lepa Kalpana, Upanaha Kalpana (poultices), Malahara Kalpana (ointments), and specific ghee preparations like Shatadhauta/Sahasradhauta Ghrita (ghee washed 100 or 1000 times), each serving distinct therapeutic purposes.

Definition

द्रव्यमार्द्रं शिलापिष्टं शुष्कं वा सद्रवं तनु।
देहे प्रलेपनार्थं तल्लेप इत्युच्यते बुधैः।।

(Dravya Gu.Vi. Yadavji)

Lepa is a preparation made by pounding freshly collected wet herbs into a fine paste, which is then applied externally to the skin for therapeutic purposes.

Synonyms of Lepa

आलेपस्य च नामानि लिप्तो लेपश्च लेपनम्।

(Sha.S.M.Kh. 11/1)

Alepa, Lipta, Lepa, Lepana.

Types

(1) According to Sushruta: 3 types–

स त्रिविधः– प्रलेपः प्रदेहः, आलेपश्च। (Su.Su. 18/6)

1. Pralepa
2. Pradeha
3. Alepa

Sr. No.	Lepa	Texture	Virya	Karma
1.	Pralepa	Thin	Shita	Pitta & Raktaroga
2.	Pradeha	Thick	Shita or Ushna	Vatakapha Nashaka
3.	Alepa	Mixed	Mixed	Raktapitta Shotha Nashaka

(2) According to Sharngadhara Samhita: 3 types–

दोषघ्नो विविधा वर्ण्यो मुखलेपस्त्रिधा मतः।

(Sha.S.U.Kha. 11/1)

1. Doshaghana
2. Vishaghana
3. Varnya

Sr. No.	Lepa	Thickness
1.	Doshaghana	¼ angula
2.	Vishaghana	1/3rd angula
3.	Varnya	½ angula

NOTE: 1 Angula- 1.95 cm

General Method of Preparation

1. Select freshly dried herbs and place them in a clean Khalva Yantra.
2. Pound the herbs into a fine powder and filter the powder to ensure smoothness.
3. Take the filtered powder back into the Khalva Yantra.
4. Add the required quantity of water or any specified liquid medium.
5. Triturate the mixture thoroughly until a fine paste is formed.
6. Use this paste as Lepa for external application.

Method of application for Lepa Kalpana

रोमाभिमुखमादेयौ प्रलेपाख्यप्रदेहकौ।
वीर्यं सम्याग्विशात्याशु रोमकूपैः शिरामुखैः।।

(Sha.S.U.Kh. 11/73-74)

Lepa should be applied in an upward or reverse direction of the hair growth on the skin Pratiloma. This method facilitates quicker absorption of the drug's potency Virya into the Shira Mukha (pores or openings).

Precautions

1. All Lepa preparations should be used immediately after preparation.
2. Wet drugs must be triturated into a very fine paste, ensuring no fibrous material remains.
3. Dry drugs should be thoroughly pounded, sieved, and the fine powder must be mixed with the specified liquid.
4. Apply Lepa against the direction of hair follicles to promote faster absorption.
5. Remove the Lepa as soon as it dries on the applied area.
6. Never apply a fresh Lepa over a previously applied one, as it can alter local temperature, causing pain and numbness.
7. Lepa is most effective in a wet state; when dry, it loses potency and may irritate the skin.

Confirmatory Test

Lepa should have a uniform consistency, along with appropriate Gandha and Varna.

Packing & Preservation

Store the final preparation in dry, airtight containers to avoid contamination and moisture, which can degrade the product's quality over time.

Shelf life

2 Years.

Example

1. Avalgunjadi Lepa

Reference: AFI, Part- 01

कुडवोऽवल्गुजबीजाद्धरितालचतुर्थभागसम्मिश्रः।
मूत्रेण गवां पिष्टः सवर्णकरणं परं श्वित्रे।।

(A.Hri.Chi. 20/13)

Ingredients Used

Drug Name	Part Used	Proportion
Bakuchi	Sd.	192 gms
Haratala- Patra	–	48 gms
Gomutra	–	Q.S.

Procedure: General Method of Preparation

Dose: External use.

Therapeutic Indications: Shvitra, Varna Vikriti.

Research Updates

Sr.No.	Article Name	Author Name	Result
1.	Pharmaceutical Standardization of Avalgujadi Lepaguti	Bharat Rathi, Prof., Department of Rasashastra and BhaishajyaKalpana, MGACH & RC, Wardha (Maharashtra)	Avalgujadi Lepaguti is made by performing three three-hour Bhavana processes on Gomutra. It turns brown with a distinct cow urine smell and gains an average of 5.55% in weight. Analytical findings of the current study set the standard for Avalgujadi Lepaguti. Varti Kalpana, derived from Vati Kalpana, shares the preparation method but differs in shape, administration route, and indications.

1. Keshavardhaka Lepa

Reference:

गोक्षुरस्तिलपुष्पाणि तुल्ये च मधुसर्पिषी।
शिरः प्रलेपनं तेन केशसंवर्धन परम्।। (Sha.S.U.Kh. 11/22)

Ingredients Used

Drug Name	Part Used	Proportion
Gokshura	Sd.	1 Part
Tila	Fl.	1 Part
Honey	–	1 Part
Go-Ghrita	–	1 Part

Procedure: General Method of Preparation

Dose: External Use

Therapeutic Indications: Hair Growth.

Research updates: No Data Found

Multiple Choice Questions

1. **What is Sharkara Kalpana in Ayurveda?**
   a. A type of solid preparation
   b. A palatable liquid formulation
   c. A type of powder preparation
   d. A type of oil-based preparation
2. **Who introduced Sharkara Kalpana to Ayurveda in the 20th century?**
   a. Charaka b. Sushruta
   c. Yadavaji Trikamaji d. Vagbhata
3. **What is the optimal concentration of sugar in Sharkara Kalpana for preservation?**
   a. 33.3% b. 50%
   c. 66.7% d. 75%
4. **Which of the following is NOT used in the preparation of Sharkara Kalpana?**
   a. Hima (cold infusion)
   b. Phanta (hot infusion)
   c. Arka (distillate)
   d. Ghrita (clarified butter)
5. **Why is the sugar content in Sharkara Kalpana important for preservation?**
   a. It adds taste to the formulation
   b. It creates high osmotic pressure, preventing microbial growth.
   c. It helps in dissolving the herbal ingredients
   d. It reduces viscosity of the preparation
6. **What is the primary difference between Sharkara Kalpana and modern syrups?**
   a. Use of artificial sweeteners in Sharkara Kalpana
   b. Sharkara Kalpana uses only herbal ingredients
   c. Syrups use herbal decoctions as the base
   d. Sharkara Kalpana uses alcohol-based solvents
7. **Which of the following is a precaution during the preparation of Sharkara Kalpana?**
   a. Boiling over high heat for quick syrup formation
   b. Using alcohol as a solvent for quick absorption
   c. Heating gently over a mild fire to prevent caramelization of sugar
   d. Skipping the filtration process
8. **What type of consistency is required in the final preparation of Sharkara Kalpana?**
   a. Thin like water
   b. Thick and syrupy, similar to honey
   c. Powdery like flour
   d. Oily consistency

8. **What confirmatory test is done to ensure the proper consistency of Sharkara Kalpana?**
   a. Dropping syrup into water to check if it dissolves
   b. Checking if the syrup floats on water
   c. Testing the color of the syrup
   d. Tasting the syrup for sweetness
9. **What is the shelf life of Sharkara Kalpana according to the Gazette of Government of India (2016)?**
   a. 1 year b. 2 years
   c. 3 years d. 5 years
10. **What is the key ingredient in Gudapaka Kalpana?**
    a. Sharkara (Sugar) b. Guda (Jaggery)
    c. Honey d. Milk
11. **Why is old jaggery preferred over fresh jaggery in Ayurvedic formulations?**
    a. It is easier to dissolve
    b. It increases Kapha
    c. It is wholesome (Pathya and beneficial for the heart
    d. It enhances digestion
12. **Which of the following is NOT a property of Guda (jaggery) used in Gudapaka Kalpana?**
    a. Excellent binding properties
    b. Increases Kapha when fresh
    c. Used in higher quantities than sugar
    d. Enhances therapeutic potential of herbs
13. **At what stage is the medicinal powder added during the preparation of Gudapaka?**
    a. After the jaggery has been dissolved and filtered
    b. Before the liquid base is heated
    c. While jaggery is still being dissolved
    d. After achieving a thread-like consistency
14. **What is the recommended thread consistency for properly preparing Gudapaka?**
    a. 1 thread b. 2 to 3 threads
    c. 4 threads d. No threads
15. **What role does temperature play in Gudapaka Kalpana?**
    a. It ensures that the sugar does not dissolve
    b. It prevents caramelization or burning of Guda
    c. It enhances the sweetness of the jaggery
    d. It ensures proper filtration of the mixture
16. **Which of the following tests confirms the proper consistency of Gudapaka during preparation?**
    a. **Water Test:** The preparation disperses immediately in water
    b. **Thread Consistency Test:** 2-3 threads can be formed when checked
    c. **Temperature Test:** The preparation reaches boiling point
    d. **Color Test:** The preparation becomes dark brown
17. **Which ingredient is typically added after the Gudapaka mixture has cooled?**
    a. Honey b. Salt
    c. Amalaki d. Vidanga
18. **What is the standard shelf life of Gudapaka Kalpana as per the Government of India Gazette?**
    a. 1 year b. 2 years
    c. 3 years d. 5 years
19. **Which of the following herbs is NOT used in the preparation of Manibhadra Guda?**
    a. Vidanga b. Haritaki
    c. Amalaki d. Brahmi
20. **What does the term 'Lavana' mean according to Shabdakalpadruma?**
    a. Purification
    b. Chedana (cutting or splitting)
    c. Healing d. Digestive
21. **Which two elements does Acharya Charaka associate with the Panchabhautika composition of Lavana?**
    a. Prithvi (earth) and Vayu (air)
    b. Agni (fire) and Jala (water)
    c. Akasha (ether) and Agni (fire)
    d. Vayu (air) and Agni (fire)
22. **What is the main method of preparation in Lavana Kalpana called when a decoction is used to mix Lavana and other drugs?**
    a. Bhavana Vidhi b. Putapaka Vidhi
    c. Lehapaka Vidhi d. Drava Kalpana
23. **Which Ayurvedic preparation method in Lavana Kalpana involves the use of Sharava containers and cow dung cakes for heating?**
    a. Lehapaka Vidhi b. Putapaka Vidhi
    c. Snehapaka Vidhi d. Kvatha Kalpana
24. **What is a crucial factor in Lavana Kalpana for ensuring the proper transformation of medicinal ingredients?**
    a. Duration of cooling b. Quantity of water
    c. Temperature control d. Size of the Sharava
25. **Which of the following is an example of a formulation prepared using the Putapaka Vidhi method?**
    a. Abhaya Lavana b. Arka Lavana
    c. Haritaki Lavana d. Lavana Bhasma

27. **Which of the following is used as an Anupana (vehicle) with Narikela Lavana?**
a. Honey b. Ghee
c. Pippali Churna d. Milk

28. **What is the shelf life of a properly prepared Lavana Kalpa?**
a. 6 months b. 1 year
c. 3 years d. 5 years

29. **Which of the following is an important precaution while preparing Lavana Kalpana using Putapaka Vidhi?**
a. Mixing with honey
b. Ensuring the junction between Sharavas is tightly sealed
c. Avoiding the use of water
d. Overheating the mixture

30. **Which of the following is a confirmatory test for Lavana Kalpana as per Rasa Tarangini?**
a. Nishchandratva (lack of shine)
b. Kajjjalavarna (blackish color)
c. Rekhapurnatva (fills lines on fingers)
d. Apunarbhava (irreversible transformation)

31. **What is the primary source of Kshara in Ayurvedic preparation?**
a. Roots of medicinal plants
b. Ash of plants that exude milky sap
c. Seeds of various herbs
d. Flower extracts

32. **What does the term 'Kshara' derive from, and what does it signify?**
a. Ksharana, meaning to boil
b. Ksharana, meaning to dissolve or remove
c. Ksharana, meaning to grind
d. Ksharana, meaning to infuse

33. **What is the method for preparing Kshara after burning the plant material?**
a. Mix with ghee
b. Dissolve in water and settle overnight
c. Mix with honey
d. Freeze the ash

34. **What is the recommended ratio of water to Kshara preparation according to Yadavji Trikamji?**
a. Four times the amount of water
b. Six times the amount of water
c. Two times the amount of water
d. Eight times the amount of water

35. **Which of the following is NOT a precaution to take during Kshara Kalpana preparation?**
a. Using clean, filtered water
b. Burning the plant material at an appropriate temperature
c. Using a metal container for dissolution
d. Allowing sufficient settling time for impurities

36. **What pH level should Kshara exhibit to confirm its alkaline nature?**
a. Below 5 b. Around 6
c. Above 7 d. Exactly 7

37. **What color flame indicates the presence of sodium in Kshara during confirmatory tests?**
a. Blue flame b. Green flame
c. Yellow flame d. Red flame

38. **What is the shelf life of properly prepared Kshara?**
a. 1 year b. 2 years
c. 3 years d. 5 years

39. **Which of the following is an indication for the use of Kadali Kshara?**
a. Skin diseases b. Gulma
c. Respiratory issues d. Bone fractures

40. **What is the recommended dosage of Kadali Kshara?**
a. 50 – 100 mg b. 125 – 250 mg
c. 500 – 1000 mg d. 1000 – 1500 mg

41. **What does the term "Ayaskriti" specifically refer to in Ayurveda?**
a. The process of extracting herbs
b. The transformation of metals into smaller pieces for therapeutic use
c. The preparation of herbal pastes
d. The infusion of oils

42. **What is the primary metal used in the preparation of Ayaskriti?**
a. Gold b. Silver
c. Iron d. Copper

43. **Which of the following is NOT included in the preparation steps for Ayaskriti?**
a. Heating thin iron sheets red-hot
b. Dipping in Triphala Kwatha
c. Mixing with coconut oil
d. Powdering the treated iron

44. **What is the significance of heating the iron sheets with dry cow dung cakes?**
a. To prevent contamination
b. To maintain proper ventilation
c. To achieve the required red-hot temperature
d. To infuse herbal properties

45. **What is the therapeutic indication of Ayaskriti?**
a. Respiratory diseases
b. Skin diseases
c. Gastrointestinal issues
d. Bone fractures

46. **How long should the sealed pot be left undisturbed after the preparation of Ayaskriti?**
a. 3 days b. 7 days
c. 10 days d. 14 days

47. **What is the correct dosage range for Ayaskriti?**
a. 1 gunja (approximately 125 mg) to 2 masha (approximately 1000 mg)
b. 5 gunja (approximately 625 mg) to 1 masha (approximately 750 mg)
c. 2 gunja (approximately 250 mg) to 3 masha (approximately 750 mg)
d. 10 gunja (approximately 1250 mg) to 1.5 masha (approximately 1125 mg)

48. **Which of the following is a precaution to consider during Ayaskriti preparation?**
a. Using low-quality iron sheets
b. Maintaining proper temperature during heating
c. Not monitoring the preparation environment
d. Using excess Pancha Lavana

49. **What is the shelf life of properly prepared Ayaskriti?**
a. 2 years b. 3 years
c. 4 years d. 5 years

50. **What should be the consistency of the powder obtained after processing Ayaskriti?**
a. Coarse and rough b. Fine and smooth
c. Gritty and uneven d. Liquid and watery

51. **What does Lepa Kalpana refer to in Ayurveda?**
a. Oral preparations
b. Topical preparations for external application
c. Inhalation therapies
d. Intravenous treatments

52. **What is the primary purpose of Lepa preparations?**
a. To enhance digestion
b. To cleanse and heal wounds
c. To reduce inflammation in joints
d. To boost immunity

53. **According to Sushruta, how many types of Lepa are there?**
a. Two b. Three
c. Four d. Five

54. **Which type of Lepa is characterized by a thin texture?**
a. Pralepa b. Pradeha
c. Alepa d. Vishaghana

55. **What is the recommended method of application for Lepa Kalpana?**
a. In a circular motion
b. Upward or against the direction of hair growth
c. Downward in the direction of hair growth
d. Randomly across the area

56. **What should be the consistency of a properly prepared Lepa?**
a. Coarse and uneven b. Liquid and watery
c. Uniform and smooth d. Gritty and rough

57. **What is the shelf life of Lepa preparations?**
a. 6 months b. 1 year
c. 2 years d. 5 years

58. **Which of the following precautions should be taken during the preparation of Lepa?**
a. Use fresh herbs only
b. Allow the Lepa to dry before application
c. Apply a fresh Lepa over a previously applied one
d. Use only wet herbs for grinding

59. **What is the primary function of Doshaghana Lepa according to Sharngadhara Samhita?**
a. To promote wound healing
b. To reduce imbalances of doshas
c. To enhance blood circulation
d. To relieve pain

60. **How should Lepa preparations be stored to maintain their quality?**
a. In a cool, humid place
b. In dry, airtight containers
c. Exposed to air for ventilation
d. In glass jars with loose lids

Answer Sheet

1.	B.	2.	C.	3.	C.	4.	D.	5.	B.	6.	B.	7.	B.	8.	B.
9.	A.	10.	C.	11.	B.	12.	C.	13.	C.	14.	D.	15.	B.	16.	B.
17.	B.	18.	A.	19.	C.	20.	D.	21.	B.	22.	B.	23.	C.	24.	B.
25.	C.	26.	B.	27.	C.	28.	D.	29.	B.	30.	B.	31.	B.	32.	B.
33.	B.	34.	B.	35.	C.	36.	C.	37.	C.	38.	B.	39.	B.	40.	B.
41.	B.	42.	C.	43.	C.	44.	C.	45.	B.	46.	D.	47.	B.	48.	B.
49.	D.	50.	B.	51.	B.	52.	B.	53.	B.	54.	A.	55.	B.	56.	C.
57.	C.	58.	A.	59.	B.	60.	B.								

Write Short Question

1. What are the key differences between Sharkara Kalpana and syrup in Ayurvedic pharmaceutical preparations?
2. What precautions should be taken during the preparation of Gudapaka to ensure its quality and efficacy?
3. What is the significance of temperature control during the preparation of Lavana Kalpana?
4. What precautions should be taken during the preparation of Kshara Kalpana to ensure its quality?
5. Write short note on Ayaskriti.
6. What is the significance of temperature control during the preparation of Lepa Kalpana?
7. What precautions should be taken to ensure the quality of Lepa preparations like Avalgunjadi Lepa and Keshavardhaka Lepa?

Write Long Question

1. Explain the general method of preparation for Sharkara Kalpana, highlighting the role of temperature and necessary precautions. Discuss confirmatory tests for validation, as well as packaging, preservation methods, and shelf life, using Tulasi Arka Sharkara as an example.
2. Outline the preparation method for Gudapaka, highlighting temperature control, precautions, confirmatory tests, and packaging and preservation methods, using Manibhadra Guda and Guda Pippali as examples.
3. Explain the preparation method for Lavana Kalpana, focusing on temperature control and necessary precautions. Outline confirmatory tests for validation and describe the packing, preservation methods, and shelf life, using Narikela Lavana as an example.
4. Explain the preparation method for Kshara Kalpana, focusing on temperature control and necessary precautions. Discuss confirmatory tests for validation and outline packaging, preservation techniques, and shelf life, using Kadali Kshara and Chincha Kshara as examples.
5. Explain the preparation method for Ayaskriti Kalpana, focusing on temperature control and necessary precautions. Discuss confirmatory tests for validation and outline packaging, preservation methods, and shelf life of the product.
6. Explain the preparation method for Lepa Kalpana, focusing on temperature control and necessary precautions. Discuss confirmatory tests for validation and outline packing, preservation methods, and shelf life, using Avalgunjadi Lepa and Keshavardhaka Lepa as examples.

• • •

12 Chaturvidha & Khalviya Rasayana

• Lecture: 4 hours, non-lecture: 4 • • Total Marks- 10 (MCQ- Yes, SAQ- Yes, LAQ- Yes) •

Chaturvidha Rasayana (चतुर्विध रसायन)

Rasashastra is a scientific branch primarily concerned with Mercury, focusing on materials known as 'Rasa Dravyas'. These substances are categorized into four classes: Rasa, Dhaatu, Ratna, and Visha. Rasa, in particular, is rich in Rasaayana properties, making Rasa Kalpas popular for their low dosage and rapid efficacy. Rasaaushadhis, being mercurial compounds, possess unique qualities; through their formulation, various substances are reduced to micro sizes, enhancing their therapeutic effects. With the presence of metals and minerals, Rasaaushadhis demonstrate heightened efficacy and swift action even in small doses, showcasing both therapeutic and Rasayana properties.

Chaturvidha Rasayana refers to the four categories of Rasayana mentioned in Ayurvedic texts:

1. Khalviya Rasayana
2. Parpati Rasayana
3. Kupipakva Rasayana
4. Pottali Rasayana

Khalviya Rasayana (खल्वीय रसायन)

Introduction

Kharaliya Rasayana is one of the most common dosage forms of medicines that contain metals and minerals as ingredients. It is frequently used in day-to-day clinical practice. Bhavana is a Samskara that alters the original properties of raw drugs and introduces new properties into the main drugs. Mardana and Bhavana Samskara play an important role in bringing minute particles of the material into contact with the liquid medium, impregnating the properties of the medium into the material, transforming coarse powder into a finer state, and facilitating further processing of the material. These processes lead to unique and suitable physicochemical changes that potentiate the efficacy of the material. Consequently, Mardana and Bhavana aid in the production of high-quality medicines, especially Kharaliya Rasayana. When prepared using classical methods, Kharaliya Rasayana is safe and effective for clinical practice at therapeutic doses.

Definition

Kharaliya Rasayana refers to formulations prepared in a Kharala through meticulous trituration until they achieve the desired characteristics.

Or

Parada and Gandhaka, along with herbs or minerals/metals, are ground together in a mortar (Khalva) to produce a finely powdered drug. According to Ayurvedic terminology, this formulation is known and classified as 'Kharaliya Rasayana'.

Uniqueness of Kharaliya Rasayana

1. Prolong the shelf life of herbal formulations.
2. Enhance therapeutic efficacy.
3. Decrease the required dosage.
4. Shorten the duration of treatment.
5. Ensure bilateral safety and efficacy for both mercury and herbs.

Types

1. **According to ingridents**:
   - With Parada: - e.g.- Hinguleshvara Rasa etc.

- Without Parada- e.g.- Gandhaka Rasayana, Laghu Sutashekara Rasa etc.

2. According to Procedure:

- Mardana: - e.g.- Shvasakuthara Rasa, Hingu-leshvara Rasa.
- Bhavana: - eg.- Arogyavardhini Vati, Tribhu-vanakirti Rasa.

General Method of Preparation of Kharaliya Rasayana

1. Essential Ingredients:

- Shuddha parada
- Hingula or rasasindura
- Shuddha gandhaka
- Drugs from maharasa, uparasa, sadharana rasa groups
- Dhatu bhasma
- Ratnoparatna bhasma/pishti
- Shuddha/sikata varga dravya

2. Liquid Preparations for Bhavana:

- **Herbal liquids:** Svarasa, kvatha, hima, phansa (from kasthaushadhi)
- Natural liquids: jala, godugdha, gomutra, ajadugdha.

3. Preparation Process:

- Take the kajjali or fine powders of other purified rasa dravya into a khalva yantra.
- Mix thoroughly to obtain a homogenous mixture.
- Triturate the mixture with any of the liquids mentioned above using the khalva yantra.

4. Completion in Khalva Yantra:

- The entire preparation is conducted in the khalva yantra.
- Perform specific bhavana/mardana in the khalva yantra.
- Collect the end product directly from the khalva yantra.

5. Final Steps:

- Dry the final product.
- Store in airtight containers for therapeutic use.

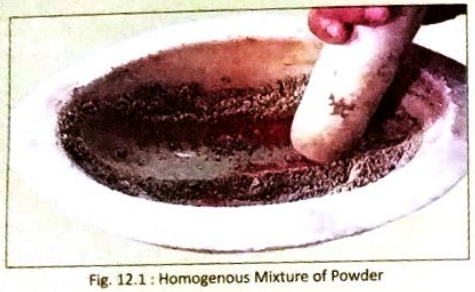

Fig. 12.1 : Homogenous Mixture of Powder

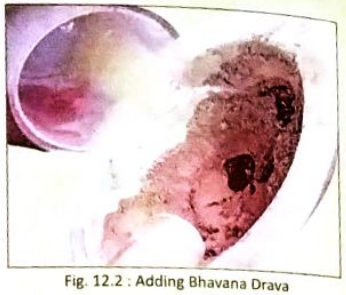

Fig. 12.2 : Adding Bhavana Drava

Fig. 12.3 : Mardana

Fig. 12.4 : End Product

Since the entire process is carried out in the khalva yantra, these preparations are called kharaliya or khalvayia rasayana.

Reasoning for Selecting Liquids for Bhavana

The selection of liquids for Bhavana in Kharaliya Rasayana is based on the ingredients and therapeutic goals of the formulation. Each drug's properties and the targeted disease condition guide the choice of specific Bhavana Dravyas. Ayurvedic compound formulations undergo rigorous trial and error combinations to establish their clinical efficacy.

1. **Synergism:** When two or more drugs with similar properties are combined and processed together, they enhance each other's activity, resulting in effects not achievable by any individual drug alone. In Gandhaka Rasayana, 11 Bhavana Dravyas boost the efficacy of Shuddha Gandhaka, expanding its effectiveness across various diseases. Similarly, in Agni Kumar Rasa, Bhavana Dravyas from Jambira Nimbu Svarasa enhance the potency of 7 herbo-mineral drugs. Jambira Nimbu Svarasa, with its sharpness (Tikshna), sour taste (Amla Rasa), and post-digestive effect (Amla Vipaka), acts as a potent appetizer.
2. **Antagonism:** When two or more drugs with opposite properties are combined and processed together, they mitigate each other's adverse effects, harmonizing their opposing qualities.
   Example: In Maricha Shodhana, Amlatakra is used as the Bhavana Dravya. The sharpness (Tikshnata), pungent taste (Katu Rasa), pungent post-digestive effect (Katu Vipaka), and hot potency (Ushna Virya) of Maricha are counteracted by the exactly opposite properties of Amlatakra, which possesses a sour-sweet taste (Amla-Madhura Rasa) and cooling potency (Shita Virya).
3. Bhavana Dravyas contribute to eliminating any disagreeable taste and unpleasant odor from the end product. For instance, in Vasanta Malati Rasa, Draksha Kvatha and Nimbu Svarasa are used to enhance palatability and add a pleasant flavor. Similarly, in Rambana Rasa, Chinchaphala Rasa is utilized to make the preparation palatable. In Kaphaketu Rasa, Ardrakasvarasa is the Bhavana Dravya chosen to improve palatability and odor.
4. The Bhavana Dravya mitigates the toxic properties of Visha Dravyas. For example, the poisonous drug Ahiphena (Papaver somniferum) undergoes purification through 21 rounds of Bhavana with Shunthi Svarasa. Similarly, Manahshila is purified through Bhavana with Nimbu Svarasa.

Shelf Life

- Rasayoga Containing Kasthaushadhi along with Rasa/ Uparasa/ Bhasma/ Guggulu- 5 Years.
- Rasayoga Containing Rasa/ Uparasa/ Bhasma except Naga Bhasma and Vanga Bhasma – 10 Years.

Shvasakuthara Rasa (श्वासकुठार रस)

Reference: AFI, Part- 01

रसो गन्धो विषं चैव टङ्कणं च मनःशिला।
एतानि टङ्कमात्राणि मरिचं चाष्टटङ्ककम्।।
एकैकं मरिचं दत्त्वा खल्वे सूक्ष्मं विमर्दयेत्।
त्रिकटु टङ्कमात्रं च दत्त्वा पश्चाद्विचूर्णयेत्।।
सर्वमेकत्र संयोज्य काचकूप्यां विनिक्षिपेत्।
कासे श्वासे च मन्दाग्नौ वातश्लेष्मामयेषु च।।
गुञ्जामात्रं प्रदातव्यं पर्णाखण्डेन धीमता।
सन्निपाते च मूर्च्छायामपस्मारे तथा पुनः।।
अतिमोहत्वमापन्ने नस्यं दत्त्वा विचक्षणः।
रसः श्वासकुठारोऽयं सर्वश्वासविकारहा।।

(Y.R. Shvasa., p. 373/1-5)

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Rasa	–	4 gms
Shuddha Gandhaka	–	4 gms
Vatsanabha	Rt. Tr.	4 gms
Shuddha Tankana	–	4 gms
Shuddha Manashila	–	4 gms
Shunthi	Rz.	4 gms
Maricha	Fr.	36 gms
Pippali	Fr.	4 gms

Procedure

1. Gather all the required dried ingredients for Shvasakuthara rasa. Ensure each ingredient is clean and free from impurities.
2. Using a Khalva Yantra or a grinder, grind each ingredient separately into a fine powder.
3. Filter each powdered ingredient through a clean cloth to remove any coarse particles.

4. Combine all the filtered powders together in a clean, dry container. Mix thoroughly to ensure a uniform blend of all ingredients.
5. Filter the compound powder mixture once again through a clean cloth to ensure a fine consistency.
6. Store the final product in sterilized, airtight glass containers to preserve its potency and freshness.
7. Label the containers with the name Shvasakuthara rasa and the preparation date.

Dose: 125 to 250 mg

Anupana: Honey

Therapeutic Indications: Agnimandya, Kasa, Shvasa, Vata Kaphaja Roga, Sannipata Roga, Murchchha, Apasmara, Meha.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Critical Review of Shvasakuthara Rasa – A Herbomineral Formulation Review Article	Bhagyalakshmi B R, Ph.D. Schlolar, Department of Rasashastra and Bhaishajya Kalpana including Drug Research	Shvasakuthara Rasa (SKR) references were gathered from classical texts, dissertations, and journals. Variants include Prathama, Dwiteeya, Maha, and Bruhat Shvasakuthara Rasa. They share consistent ingredients, with Maricha varying from one to ten parts, and Pippali, Shunti from one to six parts each. First mentioned in Rasendra Sara Sangraha (15th century AD), it's often named Shvasakuthara Rasa, a Sagandha, Niragni Khalveeya rasa yoga with Maricha as a key ingredient in most references.
2.	Component of Shvaskuthar Rasa And Their Mode of Action in Shvasa Roga	Dr. Kavita Saini, Assistant Professor, Prakash Institute of Ayurvedic Medical Science & Research (U.P.)	The study aimed to explore Shvasakuthara Rasa's therapeutic potential for asthma. Its ingredients have hot potency and Vata-Kaphahara properties, targeting the main Dosha in Shvas. This Ayurvedic preparation acts on Shvasa Roga by affecting Pranavaha Srotas.
3.	A Systematic Review on Therapeutic Potential of Shvaskuthara Rasa	Nilima Wadnerwar, Department of Agadtantra, Mahatma Gandhi Ayurved College Hospital and Research Centre, Salod [Hirapur], Datta Meghe Institute of Medical Sciences [Deemed to be University], Wardha, Maharashtra, India	A review of Shvasakuthara Rasa's clinical effects found it safe and effective as single or adjuvant therapy. Limited evidence from seven studies with small samples suggests larger studies are needed, particularly in asthma management.
4.	Anti-Microbial Study of Shvasakuthar Rasa: In Vitro Study	Das Subroto Kumar, Post graduate Diploma in Ayurvedic drugs standardization scholar, Dept. of Dravya guna, Faculty of Ayurveda, IMS, BHU, Varanasi.	In vitro systems allow control over bacteria number, antimicrobial contact time, and environmental factors like oxygen tension, pH, and temperature. Agar dilution methods determine the lowest concentration of Shvasakuthara Rasa inhibiting visible bacterial growth (minimal inhibitory concentration, MIC). MIC values indicate bacterial drug susceptibilities and assess new antimicrobial agents' activity.

Vatavidwansana Rasa (वातविध्वंसन रस)

Reference: AFI, Part- 01

रसं गन्धकं नागवङ्गं च लौहं तथा ताम्रजं व्योम निश्चन्द्रिकं च।
कणा टङ्कणं त्र्यूषणं नागरं वै पृथग्भागमेकं विमर्द्यैकयामम्।।
ततो वत्सनाभं चतुःसार्धभागं दृढं मर्दयेद् भावना व्योषजात् त्रिः।
वराचित्रकैर्मार्कवैः कुष्ठजादिभस्त्रिभिर्भावयेन्निर्गुण्डी भानुदग्धैः।।
महीधात्रिकाचन्द्रिकानिम्बुनीरैः समं भावयेद्वातविध्वंसनोऽयम्।
समीरे च शूले महाश्लेष्मरोगे ग्रहण्यां तथा सन्निपाते च सर्वे।
स्त्रिया: सूतिकावातरोगेषु दद्यान्निषेवेत गुञ्जाद्वयं सूतमेनम्।।

(Y.R., Vatavyadhi., p. 468-469/1-3)

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Parada	–	1 Part
Shuddha Gandhaka	–	1 Part
Naga Bhasma	–	1 Part
Vanga Bhasma	–	1 Part
Loha Bhasma	–	1 Part
Tamra Bhasma	–	1 Part
Nishchandra Vyoma Bhasma	–	1 Part
Pippali	Fr.	1 Part
Shuddha Tankana	–	1 Part
Shunthi	Rz.	1 Part

Drug Name	Part Used	Proportion
Maricha	Fr.	1 Part
Pippali	Fr.	1 Part
Shunthi	Rz.	1 Part
Shuddha Vatsanabha	Rt. Tr.	41/2 parts
Vyosha Kvatha	–	Q.S. For Bhavana 3 times.
Triphala Kvatha	P.	Q.S. For Bhavana 3 times.
Chitraka Kvatha	Pl.	Q.S. For Bhavana 3 times.
Bhringaraja Kvatha	Pl.	Q.S. For Bhavana 3 times.
Kushtha Kvatha	Rt.	Q.S. For Bhavana 3 times.
Nirgundi Svarasa	Lf.	Q.S. For Bhavana 3 times.
Arka Dugdha	L.	Q.S. For Bhavana 3 times.
Tamalaki Kvatha	Pl.	Q.S. For Bhavana 3 times.
Chandrasura	Sd.	Q.S. For Bhavana 3 times.
Nimbu rasa	Fr	Q.S. For Bhavana 3 times.

Procedure

1. Collect all the required dried ingredients for Vatavidvansana rasa. Ensure each ingredient is clean and free from impurities.
2. Using a Khalva Yantra or a grinder, grind each ingredient separately into a fine powder.
3. Filter each powdered ingredient through a clean cloth to remove any coarse particles.
4. Take 1 part of Shuddha Parada and Shuddha Gandhaka place it in a clean, dry mortar (Khalva Yantra).
5. Mix all the remaining powder thoroughly to ensure a uniform blend of all ingredients.
6. Filter the compound powder mixture once again through a clean cloth to ensure a fine consistency.
7. Prepare the decoctions (Kvatha) of Vyosha, Triphala, Chitraka, Bhringaraja, Kushtha and Tamalaki separately each according to their mardana time.
8. Prepare the fresh juices (Svarasa) of Nimbu and Nirgundi.
9. Add Vyosha Kvatha and triturate for 3 Bhavanas and repeat with Triphala Kvatha, Chitraka Kvatha, Bhringaraja Kvatha, Kushtha Kvatha, Nirgundi Svarasa, Arka Dugdha, Tamalaki Kvatha, Chandrasura and Nimbu Rasa, performing 3 Bhavanas each.
10. Roll the mass into small, uniform tablets.
11. Place the tablets on a clean tray and expose them to sunlight until completely dry.
12. Store the fully dried tablets in sterilized, airtight glass containers.

Dose: 250 mg

Anupana: Honey

Therapeutic Indications: Vataja Shula, Vataja Grahani, Kapharoga, Sutika Vata, Grahani, Sannipata Roga.

Research Update

Sr. No.	Article Name	Author Name	Result
1.	A Review on Vatavidhvamsana Rasa, An Ayurvedic Herbo-Mineral Preparation	Mahesh S, PhD Scholar, Department of Rasa Shastra and Bhaishajya Kalpana, Institute for Postgraduate Teaching andResearch in Ayurveda, Gujarat Ayurveda University, Jamnagar, Gujarat, India.	Information on Vatavidhvamsana rasa is scarce in databases. This formulation, used for vata vyadhis (diseases from vitiated vata), has broad-spectrum actions. The widely used combination from Yogaratnakara has notable analgesic effects, effective for musculoskeletal, post-traumatic/ surgical, and visceral pain.
2.	Pharmaceutico-Analytical Study of Vatavidhvamsana Rasa	Mahesh S, PhD Scholar, Department of Rasa Shastra and Bhaishajya Kalpana, Institute for Postgraduate Teaching andResearch in Ayurveda, Gujarat Ayurveda University, Jamnagar, Gujarat, India.	Three batches of Vatavidhvamsana Rasa were prepared using classical methods, yielding an average increase of 12.93%. Physicochemical parameters were within range: loss on drying 6.19, pH 7, total ash value 36.46, acid insoluble ash 7.16, water soluble extractive value 17.24, and alcohol soluble extractive value 7.13. HPTLC revealed 11 and 12 bands at 254 nm and 366 nm. These results establish a preliminary standard profile for Vatavidhvamsana Rasa formulation.
3.	Acute and Chronic Toxicity Study of Vatavidhvamsana Rasa, an Ayurvedic Herbomineral Formulation	Mahesh S, Central Ayurveda Research Institute, Patiala, Punjab – 147001	Vatavidhvamsana Rasa (VVR) safety was assessed through acute and 90-day toxicity studies in rats. At 2000 mg/kg, no acute toxicity was observed, suggesting an LD50 over 2000 mg/kg orally. Chronic toxicity at therapeutic (22.5 mg/kg) and higher doses (112.5 mg/kg, 225 mg/kg) showed no major adverse effects. Higher doses (225 mg/kg) indicated potential for liver and kidney-related changes but were overall safe. VVr with honey orally in rats was concluded safe in both acute and chronic toxicity evaluations.

Sr. No.	Article Name	Author Name	Result
4.	Anti-Inflammatory and Analgesic Activities of Vatavidhvamsana Rasa, an Ayurvedic Herbo-Mineral Formulation	Mahesh S, Ph.D. Scholar, Department of Rasa Shastra and Bhaishajya Kalpana, Institute for Postgraduate Teaching and Research in Ayurveda, Gujarat Ayurveda University, Jamnagar, Gujarat, India.	Vatavidhvamsana Rasa (VVR) at 22.5 mg/kg significantly reduced carrageenan-induced paw edema after 1 hour ($P<0.05$) in rats. Analgesic activity showed significant increase at 30 minutes ($P<0.05$) and non-significant increase at 60 minutes. These results confirm VVR's anti-inflammatory and analgesic effects, indicating its potential for pain and inflammatory condition management.

Parpati Kalpana (पर्पटी कल्पना)

Introduction

Parpati Kalpana is a specialized pharmaceutical technique in Ayurveda, focusing on the preparation of Parpati, a unique form of medication. The term 'Parpata' in Sanskrit denotes a thin, crisp wafer, which accurately describes the appearance of Parpati. This preparation is characterized by its thin, brittle, and wafer-like form, achieved by heating a blend of kajjali—a mixture of purified mercury and sulphur—until it transforms into a flat, brittle sheet. Despite its initial wafer-like shape, Parpati is typically powdered for medicinal use. Esteemed Ayurvedic texts, including Rasatarangini, reference Parpati as Parpatika, underscoring its significance. However, it's important to note that the Bharata Bhaishajya Ratnakara distinguishes Parpatika as the bits and fragments left in an iron vessel during Parpati preparation. These fragments, having undergone excessive heating, lose their medicinal efficacy. Parpati Kalpana thus represents a refined and meticulous process in Ayurvedic pharmaceutics, aiming to preserve the therapeutic properties of the ingredients through precise preparation techniques.

History

- Acharya Nagarjuna's Rasendra Mangala, written in the 8th century, discusses Parpati in the context of Kushtha Roga.
- Acharya Chakrapani's Chakradatta, from the 11th century, highlights Parpati as Rasa Parpati, particularly effective for Grahani Roga.
- Acharya Govind Das Sen's Bhaishajaya Ratnavali, penned in the 19th century, provides extensive explanations of various Parpatis.
- Within Bhaishajaya Ratnavali, when discussing Rasa Parpati, Shivatsanka Nirmita Rasa Parpati is emphasized as the superior option, indicating the ongoing refinement and advancement of Parpati formulations over centuries.

Definition

दुतकज्जलिका मोचापत्रके चिपिटीकृता च।
स पोटः पर्पटी सैव बालाद्यखिलरोगनुत्।। (R.R.S. 11/72)

Liquefied Kajjali is poured over neatly arranged moca patra (salmali patra) or another suitable leaf to create a thin wafer (papada). This method, called pota bandha of parada, produces Parpati.

सैव पर्पटी पोटबन्धस्यैव पर्पटीति नामान्तरम्।

(R.R.S. 11/72)

The term means "It is the same Parpati, whether referred to as pota bandha (process of making a thin wafer) or Parpati." This is from a commentary found in the Rasaratna Samuchchaya.

बालाद्यखिलरोगनुद् बालतरुणादिसमस्तव्याधिहृत्।

(R.R.S. 11/72 व्याख्या)

This method is beneficial for addressing health conditions across all stages of life, from childhood through adulthood to old age.

Synonyms

- **Parpat**: Similar to Papada
- **Parpati**: Thin flake
- **Parpatika**: Thin and brittle flake
- **Pota Bandha**: Adhesions or providing support.

Types

1. Parpati with Parada and Gandhaka:

1. Rasa Parpati:

- **Composition**: Contains Gandhaka or Parada.
- **Preparation**: Melted by heating, then cooled and prepared in the form of parpati.

2. Parpati without Parada and Gandhaka:

1. Malla Parpati:

- **Composition**: Does not contain Gandhaka or Parada.
- **Preparation**: Melted by heating, then cooled and prepared in the form of parpati.

2. Kshara Parpati:

- **Composition**: Does not contain Gandhaka or Parada.
- **Preparation**: Similar process as Malla Parpati, using alternative substances.

3. Parpati without Parada:

1. Shital Parpati:

- **Composition**: Contains Gandhaka but no Parada.
- **Preparation**: Prepared using sulfur and other components, excluding Parada.

4. Parpati without Gandhaka

1. Bhallataka Parpati:

- **Composition**: Contains Parada but no sulfur.
- **Preparation**: Uses alternative substances like rala (Shorea robusta) that liquefy upon heating and solidify upon cooling.

2. Shveta Parpati:

- **Composition**: Contains Parada but no Gandhaka.
- **Preparation**: Uses substances similar to rala to achieve the desired consistency.

Necessary Equipment's

1. **Khalva yantra (Mortar and pestle)**: An appropriately shaped and sized khalva yantra, made of stone or iron, is selected for trituration of the drugs, particularly for preparing kajjali from shuddha parada and shuddha gandhaka.
2. **Loha darvi (Iron spoon)**: An iron or copper darvi, similar in size to a larger tablespoon with a deep bottom and long handle, is chosen for liquefying the drug material in it.
3. **Tea spoon**: A stainless steel teaspoon is used for stirring kajjali in the loha darvi while melting it; alternatively, a metallic spatula can also serve this purpose.
4. **Heat source**:
   - Traditional options include glowing charcoal from various woods or modern LPG gas stoves.
   - Heat intensity (mrdu, madhyama, and khara paka) affects Parpati preparation; mild fire (around 115°C to 120°C) is ideal for melting kajjali.
   - 'Badara' and 'khadira' woods, known for stable heat, are commonly cited in classical texts for this purpose.
5. **Gomaya (cow dung)**:
   - Cow dung used in Parpati preparation should be wet and stable, not excessively thin.
   - In some instances, buffalo's dung (mahisha mala) is also utilized.
   - Alternatively, in the absence of both, smooth, stoneless wet mud may be substituted.
6. **Kadali patra (banana leaf)**:
   - Used to prevent direct contact of drug material with wet cow dung; any smooth, non-poisonous leaf can be used.
   - Options include kadali, kamala, nagavalli, arka, maca (shalmali), kutaja, palasha, and eranda patra.
7. **Sneha** : Goghrita (Cow's ghee) is applied to the loha darvi and kadali patra to prevent adherence of drug material and also gives therapeutic benefits, particularly in pacifying vitiated vata and pitta doshas.

Method of Preparation

1. Prepare Kajjali with purified mercury (parada) and sulphur (gandhaka).
2. Add other ingredients one by one and mix well in a khalva.
3. Place the mixture in an iron vessel and heat using a Sikata yantra.
4. Make a shallow pit in fresh cow dung and line it with a kadali or eranda leaf.
5. When the medicine melts and becomes liquid, pour it onto the leaf.
6. Cover with another leaf and gently press with fresh cow dung.
7. Allow the mixture to cool.
8. Remove and powder the flakes of the medicine.

Parpati Paka

मृदुर्मध्यः खरश्चेति पाकोऽत्र त्रिविधः स्मृतः।
आदौ प्रयोजयेद्वैद्यः खरन्तु विषवत्त्यजेत्।। (R.T. 6/138)

1. Mridu Paka (मृदु पाक)

a. During Preparation:

मयूरचन्द्रिकाकारं लिङ्गं यत्र तु दृश्यते।

(Bha.Bhai.R.; Br.R. 8/413 (Ras Parpati)

1. During the heating process, the drug substance changes from black to turquoise.
2. The final product obtained from a drug substance containing kajjali after mild heating.

b. After Preparation:

मृदुपाके न भङ्गः। (R.T. 6/139)

1. The resulting parpati is brittle and breaks without a crackling sound.
2. The chemical bond between mercury and sulphur in this product is not permanent.
3. Despite this, parpati with mridu paka is still used for medicinal purposes.

2. Madhyama Paka (मध्यम पाक)

a. During Preparation:

निर्धूमे बदरकाष्ठाङ्गारे न्यस्तं विलाप्य तैलसमम्।।

(Rasaparpati, Br.R. 8/411)

1. Kajjali is melting on smokeless coals made from Badara wood until it achieves an oil-like consistency.
2. The final product obtained from a drug substance containing kajjali after applying moderate heat.

b. After Preparation:

स्यात्तत्सारलङ्ग मध्यमे। (R.T. 6/139)

1. The resulting parpati is crisp and breaks with a crackling sound.
2. The edges of the broken parts are whitish in color, although the overall parpati is generally blackish.
3. The ingredients in this type of parpati form a strong bond, giving it rich medicinal properties.
4. This type of parpati is considered to be the best one.

3. Khara Paka (खर पाक)

a. During Preparation:

रक्तवर्णं भवेद्यावत्तावत्पाच्यं प्रचालयेत्।

(Rasaparpati, Bha.Bhai.R., Rasaka. Dhenu. 188)

If liquefied kajjali attains a reddish color, the resulting parpati is called Khara Paka.

b. After Preparation:

खरे चूर्णञ्च लोहितम्। (R.T. 6/139)

1. Results from applying severe heat to the drug substance, producing a parpati that is dry, coarse, and reddish in color.
2. This type of parpati becomes difficult to digest and is generally not recommended for medicinal use.
3. The exception is Rudra parpati, which is recommended to possess khara paka and is used for medicinal purposes.

Procedure of Parpati Kalpana

Fig. 12.5 : Kajjali & Kadali Leaf

Fig. 12.6 : Go-Ghrita

Fig. 12.7 : Loha Darvi

Fig. 12.8 : Mardana Process

Fig. 12.9 : Liquifing Kajjali

Fig. 12.10 : Rolled it

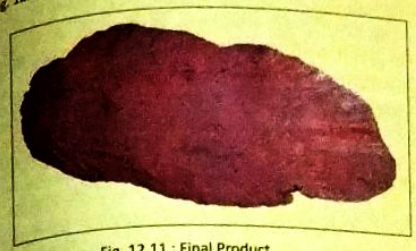

Fig. 12.11 : Final Product

Fig. 12.12 : Observation

Indication

महपानानुपानानां वैशिष्ट्यादिह कज्जली।
सर्वामयहरा वृष्या मता दोषत्रयापहा।। (R.T. 6/112)

With a suitable sahapana or anupana (adjuvant), kajjali has the ability to cure almost all types of disease conditions.

Dose & Anupana

Samanya Prayoga:

1. The parpati preparations are prescribed in a dosage of 1 to 2 ratti (125 mg to 250 mg), given twice or thrice daily until symptoms are controlled.
2. It should be taken with a suitable adjuvant, such as buttermilk or fried jiraka churna.

Kalpa Prayoga:

According to Rasatarangini 6/143

The parpati is prescribed in a specific manner. Starting with a dosage of one ratti on the first day, the dosage is increased by one ratti daily for 10 days. Then, the dosage is decreased by one ratti daily until it returns to one ratti, at which point the treatment is stopped. This course of treatment spans 20 days in total. Alternatively, the treatment can start from 2 ratti and increase up to 12 ratti.

Pathya: Kakamachi, Patola, Adraka, Vastu, Kadali Pushpa, Nava Vartaka, Purana Dhanya, Go-Dugdha.

Apathya: During parpati kalpana therapy, avoid drinking river or well water for quenching thirst; instead, consume plenty of buttermilk.

Note : According to Chakrapani, 1½ hours after taking the drug, the patient should chew a large quantity of betel nut daily. On the third day, the patient is permitted to consume meat, ghee, and milk, but should avoid vidahi, sexual intercourse, banana root, mustard oil, small fish, and aquatic birds. Additionally, the patient should drink water immediately upon waking in the early morning.

Pharmacological and Pharmacokinetic Concepts of Parpati

Pharmacological Aspects

1. **Active Components:**
   - Parpati contains mercuric sulphide (HgS) and sulfur as its primary components.
   - These elements contribute to its hot potency and digestive properties.
2. **Mechanisms of Action:**

   Stimulation of Appetite and Digestion:
   - Parpati enhances the secretion of digestive enzymes, promoting the breakdown of food.

- It increases gastrointestinal motility, facilitating the movement and absorption of nutrients.

Activation of Agni (Digestive Fire):

- Parpati stokes the digestive fire, improving metabolism and reducing the formation of ama (toxic metabolites).

Anti-inflammatory and Detoxifying Effects:

- It possesses anti-inflammatory properties that help in reducing inflammation in the gut.
- The detoxifying action aids in expelling toxins from the body.

3. Therapeutic Applications:

- Parpati is used to treat gastrointestinal disorders like anorexia, colitis, diarrhea, dysentery, and piles.
- It is also effective in systemic conditions such as gout and bronchial asthma due to its detoxifying properties.

Pharmacokinetic Aspects:

1. Absorption:

- Parpati preparations are designed to be absorbed in the gastrointestinal tract.
- The bioavailability of its active components may be influenced by the presence of sulphur, which can enhance absorption.

2. Distribution:

- Once absorbed, the active components are distributed to various tissues, primarily targeting the digestive system.
- The distribution may also include systemic circulation, addressing conditions like gout and asthma.

3. Metabolism

- The metabolism of mercuric sulphide and sulfur in Parpati involves complex biochemical pathways.
- Sulphur compounds may undergo oxidation and reduction reactions, contributing to their therapeutic effects.

4. Excretion:

- The excretion of Parpati's components likely occurs through the biliary and renal systems.
- The detoxifying action may facilitate the removal of toxins and waste products from the body.

Probable Mode of Action

Mercuric sulphide (HgS) is present in parpati, which aids in digestion and detoxification. It improves food absorption and metabolism by stimulating the release of digestive enzymes and increasing gastrointestinal motility, which lowers the production of harmful metabolites (ama). The anti-inflammatory characteristics help lower intestinal irritation, while the detoxifying activity assists in removing bodily pollutants. Parpati's constituents are efficiently utilised in the treatment of gastrointestinal illnesses such as colitis, as well as systemic ailments including gout and asthma. They are absorbed in the gastrointestinal tract, dispersed to the intended tissues, metabolised via intricate biochemical pathways, and eliminated through the biliary and renal systems.

Analytical Parameters

1. **Organoleptic Parameters:** Color, Odour and Taste.
2. **Physico- Chemical Parameters:**
   - Loss of Drying
   - Moisture Content
   - Total Ash
   - Acid Insoluble Ash
   - Total Solid Content
   - Water Soluble Extractives
   - Alcohol Soluble Extractives
   - pH
   - Tap Density
3. Identification Test- TLC/ HPTLC
4. Test for Heavy/ Toxic Metals
5. Microbial Contamination:
   - Total viable aerobic count
   - Total entero-bacteriaceae
   - Total Fungal Count
6. Test for Specific Pathogen:
   - E. Coli
   - Salmonella spp.
   - S. Aureus
   - Pseudomonas aeruginosa
7. Pesticide Residue
8. Test for Aflatoxine

Shelf Life: 10 Years

Loha Parpati (लोह पर्पटी)

Reference: AFI, Part- 01

रसभागो भवेदेको द्विगुण: शुद्धगन्धक: ।
रसतुल्यं तीक्ष्णभस्म कज्जलीं कारयेच्छुभाम् ।।
रसपर्पटिका प्रोक्ता विधानेन प्रयत्नत ।
(Siddhyog San., Atisar Prava., Grhnyadhikar, p. 33)

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Rasa	–	1 Part
Shuddha Gandhaka	–	2 Parts
Lauha Bhasma	–	1 Part

Procedure

1. Prepare Kajjali with purified mercury (parada) and sulphur (gandhaka) in a khalva.
2. Add the one part of lauha bhasma and mix well in a khalva.
3. Place the mixture in an iron vessel and heat using a Sikata yantra.
4. Make a shallow pit in fresh cow dung and line it with a kadali or eranda leaf.
5. When the mixture melts and becomes liquid, pour it onto the leaf.
6. Cover with another leaf and gently press with fresh cow dung.
7. Allow the mixture to cool.
8. Remove and powder the flakes of the medicine.
9. Store in air tight glass container.

Dose: 250 mg

Anupana: Milk, Butter Milk, Bhrishta Jiraka Churna, Dadima Svarasa.

Therapeutic Indications: Agnimandya, Grahani, Amlapitta, Pandu, Sutika Jvara, Amashula, Atisara, Kamala, Pliha Roga, Bhasmaka, Amavata, Udavarta, Kushtha, Gara, Vali Palita.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Comparative Study of Hepato - Protective Activity of Loha - Parpati Prepared By Four Different Methods	B. Santhosh	Loha Parpati, a mineral-based preparation, has properties like Lekhaniya, Rasayana, Deepana, Pachana, Raktavardhaka, and Amahara. Four preparation methods were compared for hepatoprotective activity, with Dvigunajarita Loha Parpati using Kantaloha bhasma showing superior results.

Shudha Parpati (सुधा पर्पटी)

Reference: Rasamritam

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Gandhaka	–	1 Part
Sudha Churna	–	1 Part

Procedure

1. Collect one part of Shuddha Gandhaka and Shuddha Sudha.
2. Mix well in Khalva.
3. Place the mixture in an iron vessel and heat using a Sikata yantra.
4. Make a shallow pit in fresh cow dung and line it with a kadali or eranda leaf.
5. When the mixture melts and becomes liquid, pour it onto the leaf.
6. Cover with another leaf and gently press with fresh cow dung.
7. Allow the mixture to cool.
8. Remove and powder the flakes of the medicine.
9. Store in air tight glass container.

Dose: 1- 2 ratti

Anupana: Milk, Butter Milk, Bhrsta Jeerak Chruna, Dandima Swaras.

Therapeutic Indications: Prameha, Raktapitta, Pradara, Yonisrava, Somaruja, Jirna Jvara, Daha, Amlapitta, Pidaka, Kantamala.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pharmaceutical and Preliminary Analytical Study on Sudha Parpati	Sangeeta BK, PG Scholar, Dept. of Rasashastra & Bhaishajya Kalpana, Dept. of Rasashastra & Bhaishajya KalpanaSri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka, India.	Study Revealed that:- Colour- Yellowish white Odour- Charateristics Taste- Tasteless Consistency- Solid pH- 9.2 LOD- 1.1% Total Ash- 39% Water Soluble Extractive – 1% Alcohol Soluble Extractive – 0.6%

Kupipakva Rasayana (कूपीपक्व रसायन)

Introduction

❖ Kupipakva rasayana is a specialized method of pharmaceutical preparation in traditional

medicine, focused on creating potent mercury-based compounds.

- The process name derives from four words: kupi (glass bottle), pakva (cooked), rasa (essence), and ayana (process).
- Preparations are heated in a glass bottle (kachakupi) with controlled heat levels to facilitate chemical transformations.
- The glass bottle is crucial for maintaining purity, preventing contamination, and preserving active ingredients.
- The process involves varying degrees of heat: mild, moderate, and intense.
- Based on the preparation method, it is classified into antardhuma (internal smoke) and bahirdhuma (external smoke).
- The prepared medicine is carefully collectedra from the neck or base of the bottle while it is held inverted, ensuring the product's integrity.
- Kupipakva rasayana kalpana is also referred to as sindhura kalpana.
- **स्यन्द प्रस्रवणे धातोः सिन्दूर शब्द मन्यता।**
  रक्त वर्णावभासेन प्रयोगं वर्तन्ते अस्य हः।।
- The root word "syanda prasravane," meaning releasing properties, also signifies the red color of the compound.
- Sinduras are a notable group of mercury compounds prepared through the Kupipaka method.
- This group includes both mercury compounds with sulfur and without sulfur.
- Named for their red color resembling Sindura, significant preparations include Rasa Sindura, Makaradhvaja, and Siddha Makaradhvaja.
- Rasa-puspa and Rasa Karpura, although not red, are included due to their similar preparation methods.
- Sindura kalpa is used for treating a wide range of diseases: jvara (fever), prameha (diabetes), shula (pain), bhagandara (fistula), gulma (abdominal tumors), pandu (anaemia), sthaulya (obesity), and kushtha (skin diseases).
- Also used for enhancing memory (smaranshakti), longevity (aayushyavardhaka), virility (vajikara), and treating conditions like jalodara (ascites), sankramaka jantu (infectious organisms), and vishahara (poison antidote).

History

- In the 9th century A.D., the concept of Gandhaka jarana is initially mentioned in the Rasa Hridaya Tantra, later evolving into kupipakva rasayana.
- By the 13th century A.D., information about rasa sindhura kalpana, a form of kupipakva rasayana, emerges in "Rasa Prakasha Sudhakara" by Shri Yashodhara Bhatta, employing kupi and valuka yantra in the process.
- Sri Anandadeva Suri's 14th century work "Rasachintamani" also explores this method.
- Subsequent references appear in texts like the 16th century "Rasakaumudi" and the 17th century "Ayurveda Prakasha" and "Rasatarangini."
- Even into the 20th century, texts continue to delve into various Kupipakva Rasayana kalpas.

Nirukti

- Kupi= कूपी इति काचकूपी- Glass Bottle
- Pakva= पक्वं अग्निना पक्वं- Paka in Agni
- Rasa= रसस्य पारदस्य – Parada
- Ayana= अयनं स्थानम् – Sthana

Definition

कुप्यम् अग्निनां पक्वं यदसायनं तत कूपीपक्वरसायनम्।

(Rasashastra, R.Angadi, p. 163)

Kupipakva rasayana refers to formulations created by applying specific heat to purified mercury (Shuddha parada), purified sulfur (Shuddha gandhaka), and other rasadravya in a chosen glass bottle, following the distinctive preparation method outlined in traditional texts.

Classification

1. **Depending on the ingredients**:
   - **Sagandha:** Contains gandhaka. e.g.- Rasa Sindura, Manikya rasa, Malla Sindura etc.
   - **Nirgandha:** Doesn't contain gandhaka. e.g.- Rasa pushpa, Rasa karpura etc.
2. **Depending upon the Method**:
   - **Antardhuma**: Sarava samputa method. e.g.- Rasa sindura, Rasa karpura etc.
   - **Bahiradhuma**: Kupipakva Method. e.g.- Rasa sindura, Malla sindura, Rasa Karpura etc.

3. **Depending upon the place of End Product Accumulate:**
   - **Kanthastha:** At the neck of Bottle. e.g.- Rasakarpura, Rasa Sindura.
   - **Takastha:** At the base of Bottle. e.g.- Samir-pannaga Rasa, Svarna Vanga.
   - **Ubhayastha:** Both at the base and at the neck of bottle. e.g.- Manikya Rasa, Makaradhvaja.

Procedure

The whole procedure can be divided into three stages:

a. Purva Karma

Essential Equipment's:

- **Raw Material:** The necessary drugs for this preparation are shuddha parade (purified mercury), Suddha gandhaka (purified sulfur), dhatu bhasma or dhatu patra (metal ash or leaf), any rasadravya (mineral substances), gandhakamla (sulfuric acid), and saindhava lavana (rock salt).
- **Kupi:** The kupi is used to initially hold the ingredients and later the prepared medicine.
- **Kapadamitti:**
  - Used to seal the kupi
  - Utilized in the construction of aatishi shishi
- **Valuka yantra:** The Baluka Yantra, used for preparations, consists of sand (balu) as the primary material and an earthen pot. A shalaka is used to eliminate any obstruction in the kupi during the preparation of Kupi Pakva Rasayana.
- **Valuka:** The sand selected to fill the Baluka Yantra should be clean, filtered, and uniform, as it serves as the medium for regulated heat transmission during the process. It should be free from any mixture of mud or gravel.
- **Different shalaka**:
  - **Tapta Shalaka**: One end of the rod is heated until red hot and then used to clean the mouth of the bottle when drug fumes block it during the heating process.
  - **Shita Shalaka**: A cold shalaka is used to determine the state of the kajjali, whether it is in powder form, melted, boiling, or in the sublimating compound stage.
- **Copper coin:** A copper coin is used for the copper coin test.
- **Thermometer:** A thermometer is used to assess the temperature range.

b. Pradhana Karma

1. Shuddha parada and shuddha gandhaka are triturated continuously in a khalva yantra for 4 to 5 days.
2. The resulting kajjali may undergo bhavana with any mentioned bhavana dravya.
3. Metallic foils like svarnapatra, if included, are carefully cut into smaller pieces and added to the khalva yantra.
4. Equal quantities of suddha parade are then added to the mixture and triturated rigorously for 4 to 5 days until a fine drug paste is obtained.
5. The resulting drug mass is then triturated with the specified quantity of gandhaka for 2 to 3 days.
6. Optionally, this kajjali may undergo further bhavana.
7. The bhavit kajjali is carefully collected and filled into a bottle (Kupi).
8. Seven layers of mritvastralepana must be applied to the bottle.
9. Ensure that only ¼ to 1/3 of the bottle is filled with kajjali.
10. Temporarily close the mouth of the bottle with a cork and firmly place it in the baluka yantra.

Points to be Noted

In the process of pachana, heat is crucial for gandhaka jarana, guna parivartana, and utthapanadi chemical changes to occur, especially in kupipakva rasayanas. The classical texts emphasize maintaining kramagni, which signifies a gradual increase in heating regardless of the heating method used. Kramagni is categorized as follows:

1. **Dipagni**: Temperature required for heating of Baluka.
2. **Mridu agni**: Temperature required for melting of kajjali (temperature up to 150° C to 200°C).
3. **Madhyamagni**: Temperature required for boiling of kajjali and change of properties (temperature up to 250° C to 300°C).
4. **Tivragni**: Temperature required for sublimation (temperature up to 350° C to 500°C).
5. **Svangashita**: Temperature required for complete formation of sindhura.

Procedure of Kupipakwa Rasayana

Fig. 12.13 : Raw Material

Fig. 12.14 : Kajjali Preparation

Fig. 12.15 : Mardana with Bhavana Dravya

Fig. 12.16 : Kupi Bharana

Fig. 12.17 : Baluka Yantra

Fig. 12.18 : During Process

Fig. 12.19 : Kupi Bhedana

Fig. 12.20 : Final Product

Confirmatory Test

1. **Copper Coin Test:** If a copper coin placed on the mouth of the kupi becomes covered by a white layer or exhibits characteristics of the final compound, it indicates the presence of mercury. In this critical situation, the kupi should be corked quickly to prevent the complete loss of mercury.
2. **Shita Shalaka Test:** If a shita shalaka inserted into the kupi adheres with white fumes, it suggests that gandhaka jarana is complete. Additionally, the shita shalaka will have a colored powder coating depending on the compound: a blackish coating for rasa sindhura, white for rasa pushpa, rasa karpura, and others. This positive shita shalaka test is a confirmatory test indicating that corking should be done.

Mukhamudrana Vidhi (Method of Corking)

A cork made from stone or wood should be placed in the mouth of the kupi. Then, the mouth should be covered with a cloth smeared with clay (multani mitti). For this purpose, khatika (chalk powder), guda (jaggery), madhu (honey), etc., may be used. During the corking process, a two to three-inch layer of sand should be removed from the neck of the kupi.

C. Pashchata Karma

1. Kupi Uddharana:

1. First, remove the sand from the baluka yantra.
2. Carefully remove the kupi.
3. Scrape off the layer of kapad a mitti from the kupi.
4. Clean the kupi with a wet cloth.
5. Note the level of the rasayana (finished product) inside the kupi.

2. Kupi Bhedhana:

1. Tie a thread soaked in kerosene around the middle of the kupi, just below the level of the collected compound.
2. Keep the thread horizontal and rotate it so the entire thread catches fire.
3. Once the thread is completely burnt, wrap the kupi in a wet cloth.
4. This will cause the kupi to break at the desired level.
5. Collect the rasayana, determining if it is of kantastha (upper part) or talastha (lower part) type.

Analytical Parameters

1. **Organoleptic Parameters**: Color, Odour and Taste
2. **Physico- Chemical Parameters**:
   - Loss of Drying
   - Moisture Content
   - Total Ash
   - Acid Insoluble Ash
   - Total Solid Content
   - Water Soluble Extractives
   - Alcohol Soluble Extractives
   - pH
   - Tap Density
3. **Identification Test- TLC/ HPTLC**
4. **Test for Heavy/ Toxic Metals**
5. **Microbial Contamination**
   - Total viable aerobic count
   - Total entero-bacteriaceae
   - Total Fungal Count
6. **Test for Specific Pathogen**
   - E. Coli
   - Salmonella spp.
   - S. Aureus
   - Pseudomonas aeruginosa
7. **Pesticide Residue**
8. **Test for Aflatoxine**

Key Processes in Kupipakva Rasayana Preparation

a. **Mercury and Sulfur in Kupipakva Rasayanas**: Mercury and sulfur are predominantly used in the preparation of various Kupipakva Rasayanas. Mercury is often amalgamated with metals to form an intermediate product, enhancing the surface reactivity of the metal with other chemicals. Sulfur aids in forming respective sulfides, acting alongside mercury as promoters for the final chemical reaction. Mercury, in its liquid state, readily reacts with sulfur to form black sulfide (HgS). When mercury amalgamates with metals, it converts into a semisolid mass, facilitating its reaction with sulfur to form HgS, thus promoting high-temperature reactions with other metals.

b. Heterogeneous Kinetics in Kupipakva Rasayana: Most chemical reactions in Kupipakva Rasayana preparations involve heterogeneous kinetics, such as solid-gas or solid-liquid reactions. The rate of such reactions is proportional to the interfacial area. Initially, a surface layer of the chemical forms rapidly (chemical rate controlled), and then the reaction rate slows down, becoming diffusion rate controlled. Ancient Ayurvedic scholars recognized this and addressed it by increasing the primary surface area and intermittently triturating to remove the chemical layer formed on the metal particles, thus exposing new metallic surfaces. In solid-solid reactions, trituration increased the chemical rate kinetics.

c. Sublimation Process in Kupipakva Rasayanas: Sublimation is a key process in many Kupipakva Rasayana preparations, involving the direct conversion of a solid into vapor and its subsequent condensation back into a solid state with the same composition. Ancient Rasashastra scholars, dating back to the 12th century AD, can be credited as pioneers of the sublimation process. Their practices of gradual heating, using a sand bath (Baluka Yantra) for indirect and homogeneous heating, and employing long-necked glass bottles to provide adequate space for re-solidification, exemplify their advanced understanding of chemical processes.

d. Temperature Patterns and Duration for Kupipakva Rasayanas : The temperature patterns and durations for the preparation of various Kupipakva Rasa-yanas differ, but all follow a gradual heating system. Here are the specifics for some key preparations:

1. **Rasasindura, Makaradhvaja, Malla/Tala/Shila Sindura:**
   - **Heating Grade**: Similar for all
   - **Duration**: Depends on the amount of free sulfur in the kajjali.
   - **Highest Temperature**: Around 600°C
2. **Rasakarpura:**
   - **Highest Temperature**: Should not exceed 300°C
   - **Duration**: 9 hours
3. **Rasapuspha:**
   - **Highest Temperature**: 400°C
   - **Duration**: 9 hours
4. **Swarna Vanga:**
   - **Highest Temperature**: 450°C
   - **Duration**: At least 12 hours

Rasasidhura (रससिन्दूर)

Reference: AFI Part- 01

तोलकाष्टकमितं रसेश्वरं तन्मितञ्च विमलं बलिं हरेत्।
खल्वके खलु विमर्द्य कज्जलीं भावयेदथ वटाङ्कुराम्बुभिः।।
मषीपात्रसमाकारां सुकृष्णां काचकूपिकाम्।
सतूलकुट्टितमृदा लेपयेत् खलु यत्नतः।।
स्थापयेत्कज्जलीं काचकुप्यां ततो
यत्नतः पाचयेद्वालुकायन्त्रगाम्।
अग्निवृद्धिक्रमैर्जीर्णगन्धे रसे
रोधयेद्युक्तितः काचकूपीमुखम्।।
बालुकायन्त्रके काचकूपीमुखात् रोचनासन्निभो नैति धूमो यदा।
सूतपाकक्रियाज्ञानदक्षैर्बुधैर्वेदितव्यस्तदा जीर्णगन्धो रसः।।
निवेश्य कुप्यां खटिकाविधानं जलेन सम्पेषितया प्रकामम्।।
प्रलेपयेद्वै गुडचूर्णपिष्ट्या ततः पचेद्यामयुगं रसज्ञः।।
अवबुध्य तदङ्गशीततां खलु बालारुणसूर्यसन्निभम्।
गलदेशविलग्नमुज्ज्वलं रससिन्दूरमिहाहरेद् बुधः।।
प्रमेहकरिकेशरी प्रबलशूलकालानलो
भगन्दरहरः परं खलु महाज्वरेभाङ्कुशः।
समस्तगदतस्करः सकलशोषसंशोषको
रसोऽतुलविलासदो विजयते हि सिन्दूरकः।।
अलं मलयजानिलैः किमिह भेषजानां
कुलैः वृथैव घनशीतलैः सरसचन्दनालेपनैः।
सखे मदनजीवनं रतिविलासलीलागृहं
प्रकामबलकान्तिदं भज रसं ससिन्दूरकम्।।
गुल्मप्लीहहरा रतिप्रियकरो यक्ष्मेभपञ्चाननः
पाण्डुस्थौल्यविधूननो व्रणहरो रौक्ष्याग्निमान्द्यापहः।
कुष्ठव्याधिनिषूदनो रतिकलाप्रौढाङ्गनारञ्जनः
कान्तामस्तकभूषणो रसपतिभूर्यात्सदा श्रेयसे।।
नियमयति रसेश पञ्चवातान्नितान्तं
प्रसरति धमनीनां स्वक्रिया वातसाम्ये।
दृढयति भृशमादौ जालकं नाडिकानां
रमयति च ततोऽसौ मानसं सेवकानाम्।।
बहिर्गमनशीला ये स्वेदविण्मूत्रमारुताः।
निरायासं विनिर्यान्ति रसस्यास्य निषेवणात्।।
पित्तं निःसारयत्येष न रेचयति कर्हिचित्।
न च पित्ताशयं कोष्ठं विक्षोभयति भक्षितः।।
स्फीततां दन्तवेष्टानां मुखपाकं क्षतादिकम्।
लालास्रावं प्रदाहं च न सूते चिरसेवितः।।
विकारानीदशान्यान् दारुणान् पारदोत्थितान्।
न जातु प्रकरोत्येष रसः सिन्दूरसंज्ञकः।।

दुर्जरत्वमत्यर्थप्रवृद्धं शमयत्यत्यलम्।
शुद्धे गमयत्यत्र करणानि विशेषतः।।
(R.T. 6/162-167, 190-198)

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Parada	–	1 Part
Shuddha Gandhaka	–	1 Part
Nimbu/Bijapura	Lf. Bd.	Q.S. for Bhavana

Procedure

1. Mix Shuddha Parada and Shuddha Gandhaka in Khalva Yantra to make Kajjali.
2. Apply bhavana with Valankura drava once and dry and powder the mixture.
3. Fill the powdered mixture into a glass bottle (Kachakupi).
4. Cover the bottle with cloth smeared in mud, repeating seven times up to the neck.
5. Place the bottle in a sand bath (Baluka Yantra).
6. Apply slow heat, then moderate, and finally strong heat, gradually increasing the temperature.
7. Close the bottle's mouth with a cork made of chalk or brick once the extra gandhaka burns off and Gandhaka fumes (yellow colour) stop emitting.
8. Seal the joints of the cork and bottle mouth with a paste of molasses and lime powder.
9. Apply strong heat for at least two more hours to allow the prepared compound to sublime and adhere to the neck of the bottle.
10. After cooling, collect the sublimed product (Rasa Sindura) from the neck of the bottle.
11. The product should be red, similar to the rising sun.

Dose: 125 mg

Anupana: Honey

Therapeutic Indications: Kaphaja Roga, Balakshaya, Dhatu Kshaya, Hriddaurbalya, Prameha, Shula, Bhagandara, Shotha, Gulma, Rajayakshma, Pandu, Sthulata, Vrana, Mandagni.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Review on Rasa Sindhura - A Mercurial Preparation of Indian System of Medicine	Rohit A Gokarn, Department of Rasashastra and Bhaishajya Kalpana, IPGT & RA, Gujarat Ayurved University, Jamnagar, Gujarat, India	Twenty-two classical texts, from Rasahridayatantra (10th AD) to Rasatarangini (20th Century AD), and modern research were reviewed to analyze Rasakarpura (RS) development. Varying Gandhaka proportions and preparation durations (12 hours to 7 days) were observed. Recent studies explored new RS manufacturing and characterization. Toxicity studies confirmed its safety in therapeutic doses. Scholars from the 10th to 12th Century AD were skilled in Gandhaka jarana. Across texts, 39 RS procedures showed diverse ratios, Bhavana dravya, and durations.
2.	Pharmaceutico-analytical study of Samaguna, Dwiguna and Shadguna Balijarita Rasa Sindura	P. Hrishikesh Department of Rasashastra and Bhaishajya Kalpana, JSS Ayurveda Medical College, Mysore, Karnataka, India	For Samaguna, Dwiguna, Shadguna Kajjali, trituration lasted 70, 40, 24 hours, heating for 16, 16, 19 hours. RS, 2RS, 6RS average yields: 54%, 34.44%, and 11.35%. XRD showed increased crystallinity. FTIR indicated decreased unsaturated carbon, proton with higher sulfur. XRD, FTIR favored 6RS stability over 2RS, RS.
3.	Role of Rasa Sindhura in Respiratory Disorders w.s.r. to tamaka Swasa	Dr. Sorubini Loganathan, PG Scholar, Department of Rasashastra and BhaishajyaKalpana; SDMCA, Hassan, Karnataka, India	Rasasindura, prepared through Shodhana and murchana, forms nanoparticles. It acts as a Rasayana, regulating Rasa Dhatu for respiratory disorders. With Yogavahi property, it reaches the pranavahasrotas (alveolar) and enhances respiratory formulations. Ideal for respiratory disorders, it breaks pathogenesis chains (Samprapthi vikatana) via Rasapanchaka. Its easy ADME process makes Rasasindura effective in respiratory clinical practice when used appropriately.

Rasa Karpura (रसकर्पूर)

Reference: AFI, Part- 01.

पलसंमितं प्रयत्नाद् विमलीकृतं रसेशम्।
सपलार्द्धकं पलैकं विमलं च गन्धकाम्लम्।।
चषकोपमे विशुद्धे निदधीत काचपात्रे।
विनिधाय काचपात्रं त्वयसस्निपादिकायाम्।।
ज्वलिते सुराग्रदीपे संशोषयेज्जलांशम्।
अथ शोषिते तु चूर्णं त्ववतार्य वै प्रदीपात्।।
समभागिकं दद्याल्लवणं तु सैन्धवाख्यम्।
परिमेल्य चूर्णमेतन्निदधीत काचकुप्यामू।।
युगसङ्ख्यकैस्तु यामैः सिकताख्ययन्त्रसंस्थम्।
विपचेदतिप्रयत्नात् रसतन्त्रकर्मविज्ञः।।
अवबुध्य काचकूपीं स्वत एव शीतलाङ्गीम्।।
घनसारनामधेयं रसमाहरेदमज्ञः जलीयवाष्पे
निर्यांते पिधानेन पिधापयेत्।
कूपीकण्ठस्थितां स्वल्पां सिकताञ्चापसारयेत्।।
रसकर्पूरकः ख्यातो बहुभूतविषापहः।
त्वग्रक्तदोषशमनो ग्राही रुचिविवर्द्धनः।।
अतीसारप्रशमनो विशेषात् कृमिनाशनः।
प्रवाहिकाहरः कामं मात्राधिक्ये विषक्रियः।।
स्फोटं कण्डूमपि च चिरजां मण्डलादींश्च कुष्ठान्।
सर्वोत्थं वा सहजमपि वा स्पर्शजं वा फिरङ्गम्।
शीघ्रं नानाव्रणगणभवां हन्ति पीडां महोग्रां।
कर्पूराख्यो जठरदहनोद्दीपनोऽयं रसेशः।।
शीतले षोडशगुणे सलिले विनिपातितः।
सर्वथा दृवतां याति रसः कर्पूरकाभिधः।।

(R.T., 6/65-75)

Ingredients Used

Drug Name	Part Used	Proportion
Shuddha Parada	–	48gms
Shuddha Gandhaka	–	72gms
Saindhava Lavana	–	120gms

Procedure

1. Shuddha Parada and Sandra Gandhakamla are placed in a flask.
2. Heat the flask over a fire until the water evaporates.
3. Half the Parada, Gandhakamla balance after evaporating it further add same quantity Saindhava Lavana.
4. Seive the mixture.
5. Add this into a Kupi (that is lined with Kapadamitti).
6. Next, the Kupi is fixed on Baluka Yantra for Paka.
7. Rasa Karpura is produced by sublimation, and it displaces to the neck of the Kupi.
8. Make Kupi cool out of normal cooling after Paka is made.
9. Once done, take the Kupi out of the Baluka Yantra as it cools down.
10. Then break the Kupi delicately to get Rasa Karpura.

Dose: 62 ½ to 125 mg

Anupana: Navasaradi jala, Tvaka churna,

Therapeutic Indications: Atisara, Pravahika, Krimi, Tvakagrakta Dosha, Sphota, Phirangaja Vrana, Bhuta Visa, Aruci, Kandu, Mandala Kushtha, Vrana, Agnimandya.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Review on Formulations of Rasakarpura (Mercurial Salt)	Neky Mehta, Lecturer, BAMS Foreigner's Course, Dept. of Rasashastra and Bhaishajya Kalpana, Shree GulabkunvarbaAyurved Mahavidyalaya, Gujarat Ayurved University, Jamnagar, Gujarat, India.	Rasakarpura was widely utilized to treat gonorrhea before the advent of modern antibiotics. Various dosage forms and formulations have demonstrated effectiveness even today. This research aims to provide guidance on the use of Rasakarpura formulations for treating diseases, serving as a foundation for future studies in this area.
2.	Preparation and Shodhana Methods of Rasa Karpura	Dr. Pradeep Kumar Jain Lecturer & Head, Department of Rasa Shastra and Bhaishajya Kalpana, Bundelkhand Govt. Ayurvedic College & Hospital, Jhansi (Uttar Pradesh) India.	Rasa Karpura, a white mercurial preparation (Mercuric Chloride), dissolves in hot water and is highly toxic. Ayurvedic use involves small doses (2 to 4 mg) with other substances like Dalchini powder and Navasadar. Never used alone, it requires purification and preparation in two steps. Approximately 100 grams of Rasa Karpura comes from an equal amount of Parada (Mercury).
3.	A Methodical Qualitative And Quantitative Study Of Sublime "Violet Poison" W.S.R. To Rasakarpura	Dr. Sushant Sud, Asst. Prof, Dept of Agad Tantra, SGAM, Gujarat Ayurved University, Jamnagar, India.	Rasakarpura is a white crystalline substance with a characteristic odor, having a pH of 7.24. Its particle size ranges from 18 to 31 microns, allowing for improved absorption in the body. X-ray diffraction (X-RD) analysis indicates the presence of $HgCl_2$ as the primary constituent, along with other trace elements.
4.	Underpinning The Classical Preparation Rasakarpura (Mercurial Salt) -A Review	Dr. Sushant Sud, M.D (Ayu); DHM (NIHFW); CHSE (IIPH), Asst. Prof, Dept of Agad Tantra, SGAM, Gujarat Ayurved University, Jamnagar, India.	"Rasakarpura," originating from Rasa Chintamani and practically used as "Ghana Sara Rasa" in Rasa Prakasha Sudhakara, is a purified Mercury (Parada) termed nirganda saagni murchana. Dosed at 2-4 mg, it treats ailments like phiranga, kusta, upadamsha, vrana, atisara, and pravahika. Preparation methods, including the kupipakwa technique, are described with Parada purification before murchana to avoid complications. The "Kupi" vessel is readied to prevent breakage, adding Parada, Conc H_2SO_4, and saindava lavana sequentially. Temperature ranges for preparation are Mrudu (28-220°C), Madyama (278-432°C), and Teevra (432-685°C). Rasakarpura's readiness is marked by dry paper and TamraPatra dots, sealed, heated, and opened post-sublimation.

Pottali Kalpana (पोट्टली कल्पना)

Introduction

Pottali Kalpana is a consolidated form of mercurial preparation incorporating the Pota Bandha of Parada. Pottali is a type of preparation that results from Parada Murchchhana, a procedure where mercury is thoroughly ground with other herbo-mineral drugs to enhance its therapeutic efficiency. This highly potent, concise medicament depicts maximum potency in a low dosage form. The peculiarity of Pottali lies in its typical shape, form, and preparatory methods. Pottali can be prepared using different methods, with each Yoga having its own dosage, preparation method, and therapeutic utility. Pottali Yogas are mainly mentioned in Rajayakshma and Grahani Prakaranas, and the formulation facilitates easy carrying and low dosage form. Despite the availability of many classical preparations, only a few are practiced clinically. More research is needed for the analytical and clinical evaluation of Pottali Kalpanas.

History

There are no references to Pottali Kalpana in Vedic literature. However, the term "Pottali" has been used for various purposes in Ayurvedic literature. In Charaka Samhita, the word "Pottali" appears in different contexts, primarily as a term for bundling various herbal drugs with a piece of cloth for application in sudation treatments for various diseases.

1. **Anupa or Varija Mamsa**: Tied in a Pottali, heated to warmth, and used for fomentation in Kushtha.
2. **Java, Kulattha, Masha, and Pulaka**: Tied in a cloth to form a Pottali, which is applied for fomentation in Shushka Arsha.
3. **Vacha, Kushtha, Kshaumaka, Hingu, Sarshapa, Atasi, Lashuna, Kana, etc.**: Rakshoghna drugs are made into a Pottali and hung at the northern door passage of the neonatal and postpartum ward (Sutikagara) as a disinfectant. These drugs are also advised to be tied around the neck of the newborn baby and mother.
4. **Prasevika**: The same aforementioned drugs are kept in a leather bladder (Prasevika) and tied to hang in the corner of the home. Here, the Pottali is made with leather instead of cloth.
5. **Sushruta Samhita**: Although there is no direct reference to Pottali, "Kambalika," used as an anti-ulcer remedy, resembles the appearance of a Pottali.
6. **Parada**: Tied with a cloth to form a Pottali and subjected to Svedana in Dola Yantra with some liquid media for Sanskara.
7. **Drugs for Nasya karma**: Pounded and kept in a cloth in Pottali form, dipped in rose water. This Pottali is squeezed, and 2-3 drops are administered into the nostrils. The dipped Pottali is also kept over the eyes for certain ophthalmic disorders.

All these references indicate that a Pottali is a structure resembling a pouch containing herbal or

other drugs, but it does not suggest any separate pharmaceutical processing. From the perspective of Rasashastra, however, Pottali Kalpana is considered a distinct Kalpana of metallo-mineral drugs, developed to keep multiple components like Bhasma, Dhatu, and Ratna in a compact and processed form:

- The earliest mention of Pottali is found in the Rasa Ratnakara 10/168-181, a 12thcentury A.D. treaty.
- In the 13th century, the treaty Rasa Prakasha Sudhakara 7/36 first detailed the preparation of Pottali using Gandhaka Drava Paka in the context of Vajra Pottali.
- From the 13th century onward, treaties like Rasendra Sara Sangraha, Rasa Prakasha Sudhakara, and Rasa Ratna Samuchchaya mentioned various Pottali prepared by the Puta Paka method.
- In the 14th century, Yoga Ratnakara described the preparation of Hiranya Garbha Pottali in a sulphur bath.
- Later treaties, such as Rasa Kama Dhenu, Siddha Bheshaja Manimala, and Brihat Rasa Raja Sundara, also mentioned the use of a sulphur bath in the preparation of Hema Garbha Pottali.
- Subsequently, Rasa Yoga Sagara detailed a wide range of Pottali prepared using the sulphur bath method.
- Bhaishajya Ratnavali was the first to mention Pottali preparation by Kaparda Purana, followed by Gaja Puta.
- With slight variations in the ingredients, the number of Pottali Kalpa is approximately 73.

Etymology

The word "Pottali" originates from various roots and is grammatically suffixed by different Pratyaya in various gender forms to denote a wide range of meanings. A careful lexicographical literary screening provides the following descriptions to reveal the meaning of Pottali.

Definition

विस्तारितस्य वस्तुनः अल्पो भवनं पोट्टम्।
पोट्टलाति गृह्णाति इति पोट्टली।। (Parad Vig., p. 168)

Pottali can be defined as the process of collecting scattered materials into a compact and comprehensive form. Essentially, the technique or processing that provides compactness to these scattered particles is known as Pottali Kalpana.

Classification

1. **According to Apperance**:
   - Solid Form (Conical)- e.g.- Hemagarbha Pottali etc.
   - Powder Form (Churna)- e.g.- Hamsa Pottali Rasa, Gandhakadi Pottali Rasa etc.
   - Bhasma- e.g.- Mriganka Pottali, Shankha Garbha Pottali etc.
2. **According to Ingredients**:
   - With Parada: - e.g.- Ratna Garbha Pottali, Hema Garbha Pottali.
   - Without Parada: - e.g.- Gandhakadhi Pottali.
   - With Gnadhak: - e.g.- Ratna Garbha Pottali, Hema Garbha Pottali.
   - Without Gandhaka: - e.g.- Vajra Pottali
3. **According to Agni Samskara**: -
   - Without Agni: -Hamsa Pottali, Gandhakadi Potalli.
   - With Agni:
     i. **Puta Paka:** Lokanatha Potalli (Gajaputa), Rasa Potalli (Bhudhara Puta)
     ii. **Yantra Paka:** Kaparda Pottali (Lavana Yantra), Hemagarbha Pottali (Dola Yantra)

General Method of Pottali Kalpana

Based on the available literature on Pottali Kalpana, it can be inferred that during the early Rasa Shastra period, Acharyas utilized metals, minerals, and Ratna either in purified or Bhasma form. However, during the medieval period, a distinct methodology was developed to consolidate herbal, mineral, and Ratna constituents into a single formulation, known as Pottali Kalpana. This was systematically achieved through three fundamental procedures:

1. Bhavana Sanskara
2. Puta Paka Sanskara
3. Pottali Paka

1. **Bhavana Sanskara:** Upon reviewing the literature, only three Pottali preparations are mentioned to be prepared by this methodology: Hamsa Pottali Rasa, Gandhakadi Pottali Rasa and Gandhakadi Pottali Rasa. In this procedure, all ingredients must be purified, properly processed, and incinerated (if Bhasma is to be added), and then finely powdered. These ingredients are then subjected to Bhavana in a Khalva Yantra along with some herbal liquid media. If specific herbal media is not mentioned, the pulp of Kumari is typically used. Bhavana continues until the mass attains a viscous and semisolid state. After repeating this procedure for 3 to 7 times and examining the Shubhavita Lakshana, the entire mixture is collected, dried, powdered, and preserved.

2. **Puta Paka Sanskara:** In the Puta Paka Sanskara, a specialized technique is employed wherein minerals, metals, precious stones, and other substances are incinerated to ashes by subjecting them to appropriate heat repeatedly. This process causes the subjected matter to lose its original shape, color, nature, luster, etc., ultimately resembling ash. From the literature of the Rasa Shastra, Puta Paka is traditionally meant for the Marana of Rasa, Maharasa, Dhatu, Ratna, etc. However, in the context of preparing Pottali, all ingredients such as Sindura, Dhatu, Bhasma, Churna, etc., undergo the Puta Paka process. During the preparation of Pottali, several points are taken into consideration, especially for those prepared using the Puta Paka method.
   - **Ingredients:** Most Pottali prepared by Puta Paka consist of Sindura, Dhatu in Shodhita or Bhasma form, Bhasma of Sudha Varga, and Ratna Varga Dravya, making them metalo-mineral in nature.
   - **Bhavana:** Ingredients are triturated with suitable herbal media until a uniform mixture is obtained and dried in either powder or Gutika form, based on the Marana procedure.
   - **Marana:** Different heat levels like Gaja Puta, Kukkuta Puta, Bhudhara Puta, Bhanda Puta, etc., are used for incineration. Special techniques for Putapaka of Pottali include:
     - Mixture in fine powder form is sealed in Kaparda with Tankana and Cow's milk paste, then subjected to Gaja Puta. After cooling, Kaparda are powdered for preservation. Examples: Ratna Garbha Pottali, Lokanatha Pottali, Hema Garbha Pottali.
     - Mixture after Bhavana is filled into a Musha made from Shankha Bhasma, sealed with Tankana Bhasma paste, and coated with Cow's milk. This is then subjected to Gajaputa in Sharava Samputa. After cooling, the Pottali and Musha are powdered. **Example:** Shankha Garbha Pottali.
3. **Pottali Paka**: During the preparation of Pottali, particularly those prepared in the medium of molten sulfur, the following points are carefully considered:
   - **Ingredients:** Selection of appropriate ingredients including metals, minerals, and herbs.
   - **Binding agent (Svarasa for Bhavana**: Utilization of suitable herbal extracts for the Bhavana process. Mainly Kumari Svarasa is used for binding and trituration of Pottali, besides Isabgola, Babbula Niryasa, Tulasi Svarasa etc.
   - **Shape of Pottali:** Determination of the form or shape of the Pottali. Some texts describe the shape of Pottali differently
     1. **"Shikhara-arambhika akara"**: The base is wide, narrowing towards the top, resembling a pyramid shape (Rasayana Sara).
     2. **"Pugakara"**: Resembling the shape and size of Puga Phala, the fruit of Araca catechu nut (Vachaspati).
     3. **"Karsha manashcha vartika"**: Shaped like a Varti and approximately weighing one Karsha (12 grams).
     4. **"Shankvakara"**: Conical in shape.
   - **Drying of Pottali:** Ensuring proper drying of the Pottali after preparation.
   - **Container:** Selection of suitable containers for storing the Pottali.
   - **Cloth:** Utilization of cloth for bundling or wrapping the Pottali. Use silk cloth to tie the Pottali for Gandhaka Paka.
   - **Quantity of sulfur for Paka:** The quantity of sulfur prescribed varies:
     - Some texts suggest it to be equal to the weight of the Pottali taken (Y.R.).
     - Others recommend 2 to 6 times the weight of the Pottali (R.S.).

- Vasudev Mulashankar Dwivedi advises a base of 2 inches of Gandhaka and 1 inch of Gandhaka after placing the Pottali.
- Certain texts suggest taking the Gandhaka twice the amount of Suvarna in the Pottali.
- h. **Agni Pramana**: Control and measurement of the intensity of heat used during procedure.

a. Paka Kala: Rasashastra texts offer different perspectives on the duration of Pottali Paka:

- Yamardha, Yamaka, Ghatika, Ghatadwaya, and Dwiyamam suggest durations ranging from 1 hour to 8 hours.
- However, according to (Y.R.), the Paka Kala extends until the attainment of Vyoma Varna of Gandhaka.

b. Paka Lakshana: (a) The Paka of Pottali is deemed perfect or completed when the color of the sulfur becomes:

- Vyoma Varna (Black)
- Nilashyama (Bluish black/dark black)

(b) The metallic sound produced by the Pottali when banged against the container or any hard substances.

(c) Burning of cloth: During processing, when the cloth containing Pottali is burnt, this sign is considered one of the Paka Lakshana of Pottali.

c. Pashchata karma: The Pottali is removed after attaining Paka Lakshana, and the silk cloth is removed by cutting it with a sharp instrument. Once the Pottali has cooled, it is scratched with a knife to remove the superficial coating of Gandhaka adhered to it. Then, it is buffed with a cloth to polish the surface. The resulting Pottali is stored safely in a suitable container for therapeutic use.

Fig. 12.21 : Adding Parada in homogemous mixure

Fig. 12.22 : Kajjali Prepared

Fig. 12.23 Shikhara Shape Sprinkling

Fig. 12.24 : Shuddha gandhaka over the silk clote

Fig. 12.25 : During Paka

Fig. 12.26 : Final Product

Mode of Administration

The Pottali should be rubbed over a stone for the desired number of rotations, applying mediums such as Madhu, Ghrita, and Ardraka Svarasa. The resulting paste is then administered orally.

Pathya (Recommended)

Consumption of Ghrita, Dadhi, Shali, and Shaka without Hingu.

Apathya (Contraindicated)

Avoidance of Amla Dravya, Taila, Bilva, Kanji, Kakarashtaka, nighttime awakening, as well as anger and stress in women.

Exceptions to the nomenclature of Pottali are found in texts, where formulations made following the procedure of Pottali Kalpana are not attributed to the term "Pottali." Conversely, some formulations are named as Pottali but lack attributes of Pottali:

- Hamsa Pottali Rasa and Agni Kumara Rasa are Kharaliya preparations similar to Hamsa Pottali but not named as Pottali.
- Maha Hema Garbha Rasa is akin to Hema Garbha Pottali but not termed as Pottali.
- Karsha Pottali resembles Lokanatha Rasa but is not termed as Pottali.

Analytical Parameters

1. Organoleptic Parameters: Color, Odour and Taste
2. Physico- Chemical Parameters:
   - Loss of Drying
   - Moisture Content
   - Total Ash
   - Acid Insoluble Ash
   - Total Solid Content
   - Water Soluble Extractives
   - Alcohol Soluble Extractives
   - pH
   - Tap Density
3. Identification Test- TLC/ HPTLC
4. Test for Heavy/ Toxic Metals
5. Microbial Contamination
   - Total viable aerobic count
   - Total entero-bacteriaceae
   - Total Fungal Count
6. Test for Specific Pathogen
   - E. Coli
   - Salmonella spp.
   - S. Aureus
   - Pseudomonas aeruginosa
7. Pesticide Residue
8. Test for Aflatoxine

Tamragarbha Pottali (ताम्रगर्भ पोट्टली)

Reference: Vaidhya Pandit Haripraparnaji, The Rasayogasagara, Sree Bhaskara Aushadhalaya, Mumbai, 1930, Pg 581

Ingredients Used

Drug Name	Part Used	Proportion
Tamra Bhasma	–	23 gms
Samaguna Kajjali	–	2.3 gms
Shuddha Gandhaka Choorna	–	0.6 gms
Shuddha Svarana Patra	–	12 Ratti
Kumari Svarasa	Lf.	Q.S.

Procedure

1. Parada and Shodhita Svarna Patras were triturated to prepare Dhatu Pishti.
2. Dhatu Pishti underwent prakshalana (washing) with Nimbu Svarasa and Saindhava.
3. Shodhita Gandhaka was added to the Dhatu Pishti, and trituration was performed until the attainment of Kajjali Siddhi Lakshanas.
4. Tamra Bhasma was incorporated into the prepared Kajjali, followed by trituration for 24 hours.
5. Kumari Svarasa Bhavana was administered to the Tamra Garbha Pottali Kajjali seven times.
6. After seven days, ensure the paste becomes soft and easily rolls into pill form without sticking to the fingers.
7. Shape the paste into Shikharakara/Pugphalakriti (cone shape with a flat bottom and tapering upwards) using honey.
8. Place the Apakva Pottali in Gandhaka powder over a silk cloth.
9. Tie the Pottali and hang it in a porcelain glass beaker containing liquefied Ashudha Gandhaka.

10. Keep the setup on a hotplate with a low flame, recording the temperature every 30 minutes to keep Gandhaka in liquid form.
11. The next day, when the temperature of the Pottali reaches room temperature, remove the outer coverings of the Pottali.
12. Take out the Pottali, and scrape off any Gandhaka adhered to the outer surface with a knife.
13. Store in air tight glass container.

Dose: 1/2 – 1 Rati

Anupana: Adaraka Svarasa, Madhu.

Therapeutic Indications: Svasa, Kasa, Jvara, Shula, Shosha, Kaphaja Janya Tridosha.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Tamragarbha Pottali -A Compact Drug Formulation in Ayurveda Rasasastra	Ebin T U, M.D Rasasastra and Bhaishajya Kalpana Former PG scholar, Govt. Ayurveda College, Thiruvananthapuram. Former Resident MedicalOfficer, SNA Ayurveda Nursing Home, Thrissu	Tamragarbha Pottali, a Gandhaka Dravitha type, was prepared with Tamra Bhasma, Kajjali, and Gandhaka. Careful temperature control prevented Sulphur from burning. The resulting product, a Copper-Mercury-Sulphur complex, formed at a maximum of 291 degrees Celsius. This potent form allows for rapid absorption and distribution of its ingredients. Despite meticulous preparation, Tamragarbha Pottali effectively manages Kapha Pradhana Dosha-related diseases, exhibiting actions like Lekhana, Srotosodhana, and Rasayana.
2.	A Research on Pharmacuetical Preparation of Tamra Garbha Pottali	Himabindu, Assistant Professor, Dept of RSBK, Nagur Ayurveda Medical College, Bijapur, A.P.	A pilot study with 6 Pottalis established the Pottali paka temperature and assessed features like Vyomavarna of Gandhakapaka, Pottali hardness, and cloth changes. The main study, in 2 batches, followed pilot study standards, observing study duration, Paka temperature, and Gandhakavarna changes until achieving Vyomavarna. This study provided a pharmaceutical method for Tamragarbha Pottali paka.
3.	Quality Assessment of the Copper Compounds Through NPST With Special Reference to Tamra Sindura and Tamra Garbha Potalli.	Dr. Jyoti Sharma, PG Scholar, Department of RSBK, Parul Institute of Ayurveda, Vadodara-390019, Gujarat, India	In this study, Tamra Gharba Potalli underwent NPST analysis following CCRAS guidelines, with observations made at three intervals: within 5 minutes, between 5 and 20 minutes, and beyond 20 minutes to several hours or days. The results met NPST standards, showing diverse color and pattern differences based on the compound's components.

Loha Grarbha Pottali (लोह गर्भ पोटली)

Reference: Vaidya Pandit Hariprapannaji. Rasa Yoga Sagara. Varanasi: Chaukhamba Krishnadas Academy; 1998, 2ndVolume, 581pp

Ingredients Used

Drug Name	Part Used	Proportion
Loha Bhasma	–	10 Karsha
Kajjali	–	1 Karsha
Suddha Gandhaka	–	1 Tanka
Suddha Swarana Patra	–	12 Ratti
Adaraka Sawarasa	Rz.	Q.S.

Procedure

1. Parada and Shodhita Svarna Patras were triturated to prepare Dhatu Pishti.
2. Shodhita Gandhaka was added to the Dhatu Pishti, and trituration was performed until the attainment of Kajjali Siddhi Lakshanas.
3. Loha Bhasma was incorporated into the prepared Kajjali, followed by trituration for 24 hours.
4. Adaraka Svarasa Bhavana was administered to the Loha Garbha Pottali Kajjali seven times.
5. After seven days, ensure the paste becomes soft and easily rolls into pill form without sticking to the fingers.
6. Shape the paste into Shikharakara/Pugphalakriti (cone shape with a flat bottom and tapering upwards) using honey.
7. Place the Apakva Pottali in Gandhaka powder over a silk cloth.
8. Tie the Pottali and hang it in a porcelain glass beaker containing liquefied Ashuddha Gandhaka.
9. Keep the setup on a hotplate with a low flame, recording the temperature every 30 minutes to keep Gandhaka in liquid form.

10. The next day, when the temperature of the Pottali reaches room temperature, remove the outer coverings of the Pottali.
11. Take out the Pottali, and scrape off any Gandhaka adhered to the outer surface with a knife.
12. Store in air tight glass container.

Dose: 125 mg

Anupana: Adaraka Svarasa, Madhu

Therapeutic Indications: Pandu, Sangrahni, Kamala, Prameha, Pradar.

Research Updates

Sr. No.	Article Name	Author Name	Result
1.	Pharmaceutico Analytical Study of Lohagarbha Pottali	Anupama Janakiram, PG Scholar, TGAMC, Ballari, Karnataka, India	Lohagarbha Pottali was made from Loha Bhasma (10 Karsha), Vishudha Kajjali (1 Karsha), Shuddha Gandhaka (1 Tanka), and Shuddha Swarnatanutantukanda (6 rattika), resulting in Lohagarbha Pottali Kajjali. It underwent Bhavana with Kumarisvarasa for 7 days using the Gandhakapaka method with Valukayantra. The black compound yielded an average of 103.3% after Pottali paka. Chemically, Lohagarbha Pottali is a complex compound containing Fe_2O_3, Fe_3O_4, S, HgS, AuO, and organic compounds with carboxylic acid groups.

Multiple Choice Questions

1. **What is the primary focus of Rasashastra?**
   a. Herbal medicine
   b. Pulse diagnosis
   c. Mercury and its compounds
   d. Surgical procedures
2. **Which of the following is NOT one of the four categories of Chaturvidha Rasayana?**
   a. Khalviya Rasayana
   b. Parpati Rasayana
   c. Kupipakva Rasayana
   d. Panchagavya Rasayana
3. **In the preparation of Kharaliya Rasayana, what is the purpose of the Samskara Bhavana?**
   a. To increase the size of particles
   b. To introduce new properties into the main drugs
   c. To reduce the efficacy of the drugs
   d. To eliminate all mineral content
4. **Which of the following ingredients is commonly used in the preparation of Kharaliya Rasayana?**
   a. Shuddha parada b. Chyavanprasha
   c. Ashvagandha powder
   d. Triphala
5. **What is the main reason for using Bhavana Dravyas in Kharaliya Rasayana?**
   a. To change the color of the preparation
   b. To facilitate the drying process
   c. To enhance the palatability and therapeutic efficacy
   d. To increase the quantity of the final product
6. **In Gandhaka Rasayana, how many Bhavana Dravyas are typically used to boost the efficacy of Shuddha Gandhaka?**
   a. 5 b. 7
   c. 9 d. 11
7. **Which of the following is an example of a Kharaliya Rasayana that does NOT contain Parada?**
   a. Hinguleshvara Rasa
   b. Gandhaka Rasayana
   c. Laghu Sutashekara Rasa
   d. Shvasakuthar Rasa
8. **Which type of liquid preparation is commonly used for Bhavana in Kharaliya Rasayana?**
   a. Svarasa b. Honey
   c. Coconut oil d. Sesame oil
9. **What is the shelf life of Rasayoga containing only Rasa/Uparasa/Bhasma (except Naga Bhasma and Vanga Bhasma)?**
   a. 1 year b. 5 years
   c. 10 years d. 15 years
10. **Which Bhavana Dravya is used to counteract the sharpness and hot potency of Maricha in Maricha Shodhana?**
    a. Amlatakra b. Jala
    c. Draksha Kvatha d. Nimbu Svarasa

11. What is the primary therapeutic indication for Shvasakuthara Rasa?
a. Vataja Shula
b. Shvasa (respiratory disorders)
c. Sutika Vata
d. Grahani

12. Which ingredient is used in the highest proportion in Shvasakuthara Rasa?
a. Maricha
b. Shuddha Gandhaka
c. Pippali
d. Shunthi

13. How many Bhavanas are performed with each Kvatha during the preparation of Vatavidvanshana Rasa?
a. 1 Bhavana
b. 2 Bhavanas
c. 3 Bhavanas
d. 4 Bhavanas

14. Which of the following is NOT an ingredient in Shvasakuthara Rasa?
a. Shuddha Parada
b. Shuddha Tankana
c. Shuddha Gandhaka
d. Naga Bhasma

15. What is the recommended Anupana (vehicle) for both Shvasakuthara Rasa and Vatavidvanshana Rasa?
a. Milk
b. Water
c. Honey
d. Ghee

16. What is the primary component of Parpati?
a. Silver and Sulphur
b. Gold and Mercury
c. Mercury and Sulphur
d. Copper and Tin

17. Which Ayurvedic text highlights Parpati as Rasa Parpati, particularly effective for Grahani Roga?
a. Rasendra Mangala
b. Chakradatta
c. Bhaishajaya Ratnavali
d. Rasa Tarangini

18. What is the term used to describe the process of making a thin wafer in Parpati preparation?
a. Rasashastra
b. Pota Bandha
c. Gandhaka Kalpana
d. Marana

19. Which type of Parpati is considered the best in terms of medicinal properties?
a. Mridu Paka
b. Madhyama Paka
c. Khara Paka
d. Shitala Parpati

20. What should be avoided during Parpati Kalpana therapy?
a. Buttermilk
b. Betel nut
c. River or well water
d. Ghee and milk

21. Which wood is traditionally used to achieve stable heat during Parpati preparation?
a. Khadira
b. Neem
c. Bamboo
d. Mango

22. Which Parpati preparation does NOT contain Gandhaka or Parada?
a. Rasa Parpati
b. Malla Parpati
c. Shitala Parpati
d. Bhallataka Parpati

23. In Parpati Kalpana, what is the suitable temperature range for melting Kajjali?
a. 80°C to 100°C
b. 115°C to 120°C
c. 130°C to 150°C
d. 160°C to 180°C

24. Which leaf is commonly used to prevent direct contact of drug material with cow dung in Parpati preparation?
a. Neem leaf
b. Banana leaf
c. Mango leaf
d. Tulsi leaf

25. What is the recommended dosage range for Parpati preparations in Samanya Prayoga?
a. 1 to 2 grams
b. 250 to 500 mg
c. 1 to 2 ratti (125 mg to 250 mg)
d. 5 to 10 grams

26. Which type of Parpati is obtained when Kajjali is heated until it attains a reddish color?
a. Mridu Paka
b. Madhyama Paka
c. Khara Paka
d. Shitala Parpati

27. What is the shelf life of Parpati as per the analytical parameters?
a. 5 Years
b. 10 Years
c. 15 Years
d. 20 Years

28. Which of the following is NOT a necessary equipment in Parpati preparation?
a. Khalva yantra
b. Loha darvi
c. Copper vessel
d. Kadali patra

29. In Parpati Kalpa Prayoga, how many days is the course of treatment?
a. 10 days
b. 15 days
c. 20 days
d. 25 days

30. Which substance is applied to the loha darvi and kadali patra to prevent adherence of drug material?
a. Honey
b. Ghee
c. Oil
d. Milk

31. What is the primary composition of Kajjali used in the preparation of Loh Parpati?
a. Mercury and Iron
b. Iron and Sulphur
c. Mercury and Sulphur
d. Iron and Zinc

32. Which of the following is not a therapeutic indication for Loh Parpati?
a. Agnimandya
b. Prameha
c. Grahani
d. Amlapitta

33. What is the recommended Anupana (vehicle) for administering Loh Parpati?
a. Water
b. Milk
c. Honey
d. Ghee

34. Which text provides the reference for the preparation of Shuddha Parpati?
a. Rasamritam
b. Siddha Yoga Sangraha
c. Rasa Tarangini
d. Charaka Samhita

35. What is the recommended dosage for Shuddha Parpati?
a. 125-250 mg
b. 1-2 ratti
c. 2-4 ratti
d. 250-500 mg

36. What is the primary material used to heat Kupipakva Rasayana preparations?
a. Water
b. Sand
c. Oil
d. Air

37. Which of the following is a sagandha (contains sulfur) Kupipakva Rasayana?
a. Rasa Sindura
b. Rasakarpura
c. Rasapushpa
d. Svarna Vanga

38. The term "Kupipakva Rasayana" refers to formulations created by heating substances in a:
a. Clay pot
b. Metal vessel
c. Glass bottle
d. Wooden container

39. Which test is used to confirm the presence of mercury during the Kupipakva Rasayana process?
a. pH Test
b. Copper Coin Test
c. TLC Test
d. Smell Test

40. In the classification of Kupipakva Rasayana based on the method, Antardhooma is associated with which method?
a. Kupipakva Method
b. Sharava Samputa Method
c. Svarna Patra Method
d. Kapada Mitti Method

41. The final product of which Kupipakva Rasayana preparation accumulates at the neck of the bottle (Kanthastha)?
a. Rasakarpura
b. Malla Sindura
c. Samirpannaga Rasa
d. Svarna Vanga

42. Which is NOT a key stage in the Kupipakva Rasayana preparation process?
a. Purva Karma
b. Pradhana Karma
c. Pashchata Karma
d. Bhavana Karma

43. The Valuka Yantra is primarily used for:
a. Measuring temperature
b. Storing the final product
c. Regulating heat during preparation
d. Mixing ingredients

44. The gradual increase in heating, referred to as Kramagni, involves several stages. Which stage represents the highest temperature?
a. Dipagni
b. Mridu Agni
c. Madhyamagni
d. Tivragni

45. Sindura Kalpa in Kupipakva Rasayana is used to treat which of the following conditions?
a. Jvara (fever)
b. Kasa (cough)
c. Arsha (hemorrhoids)
d. Vrana (wounds)

46. The root word "Syanda prasrvane" in Sindura Kalpana refers to which property of the compound?
a. Smell
b. Red color
c. Solid state
d. Bitter taste

47. Which of the following is a nirgandha (doesn't contain sulfur) Kupipakva Rasayana?
a. Rasa Sindura
b. Rasapushpa
c. Manikya Rasa
d. Malla Sindura

48. The Shita Shalaka test is used to:
a. Measure the moisture content
b. Determine the pH level
c. Check the state of Kajjali
d. Assess the particle size

49. Which substance is NOT typically used in the preparation of Kupipakva Rasayana?
a. Mercury (Parada)
b. Sulfur (Gandhaka)
c. Iron (Lauha)
d. Copper (Tamra)

50. Rasa Hridaya Tantra, which mentions the concept of Gandhaka Jarana, dates back to which century?
a. 9th century A.D.
b. 12th century A.D.
c. 14th century A.D.
d. 17th century A.D.

51. What is the primary therapeutic use of Rasasindura?
a. Atisara (Diarrhea)
b. Mandagni (Weak digestion)
c. Hriddaurbalya (Weakness of heart)
d. Tvakagrakta Dosha (Skin disorders)

52. **Which of the following is NOT an ingredient in the preparation of Rasasindura?**
   a. Shuddha Parada b. Nyagrodha
   c. Saindhava Lavana d. Shuddha Gandhaka

53. **What is the recommended dosage for Rasa Karpura?**
   a. 250 mg b. 125 mg
   c. 62½ mg to 125 mg d. 500 mg

54. **What is the correct Anupana (vehicle) for consuming Rasasindura?**
   a. Honey b. Navasaradi jala
   c. Tvaka churna d. Water

55. **Which process is common in the preparation of both Rasasindura and Rasa Karpura?**
   a. Use of Valuka Yantra
   b. Bhavana with Valankura drava
   c. Adding Saindhava Lavana
   d. Sealing the mouth of the Kupi with molasses and lime powder

56. **What is the primary purpose of Pottali Kalpana in Ayurveda?**
   a. To create herbal oils
   b. To consolidate herbal and mineral drugs into a compact form
   c. To prepare fresh herbal juices
   d. To distill essential oils

57. **Which of the following texts is the earliest to mention Pottali Kalpana?**
   a. Charaka Samhita b. Sushruta Samhita
   c. Rasa Ratnakara
   d. Rasa Prakasha Sudhakara

58. **According to the classification of Pottali Kalpana, which type is shaped like a pyramid?**
   a. Shikhara-arambhika akara
   b. Pugakara
   c. Karsha manashcha vartika
   d. Shankvakara

59. **What is the method called when ingredients are subjected to repeated incineration in Pottali preparation?**
   a. Bhavana Sanskara b. Puta Paka Sanskara
   c. Pottali Paka d. Kshara Paka

60. **Which herbal liquid is typically used for Bhavana in the preparation of Pottali?**
   a. Rose water b. Kumari Svarasa
   c. Tulasi Svarasa d. Navasaradi Jala

61. **In Pottali Kalpana, what shape does the Pottali with a base wide and narrowing towards the top resemble?**
   a. Varti b. Puga Phala
   c. Conical shape d. Pyramid shape

62. **Which Pottali is specifically mentioned to be prepared by using a sulfur bath?**
   a. Ratna Garbha Pottali
   b. Shankha Garbha Pottali
   c. Hema Garbha Pottali
   d. Lokanatha Pottali

63. **What is the common method for drying the Pottali after its preparation?**
   a. Sun drying b. Air drying
   c. Drying in a sand bath
   d. Oven drying

64. **Which test is NOT a standard analytical parameter for Pottali Kalpana?**
   a. TLC/HPTLC
   b. Pesticide Residue
   c. Organoleptic Parameters
   d. Total Viable Aerobic Count

65. **What is the typical dosage range for Pottali Kalpana?**
   a. 10-50 mg b. 50-100 mg
   c. 125-250 mg d. 500-1000 mg

66. **What is the primary ingredient used in the preparation of Tamragarbha Pottali?**
   a. Loha Bhasma b. Tamra Bhasma
   c. Samguna Kajjali d. Shuddha Svarna Patra

67. **What is the process used to wash the Dhatu Pishti in Tamragarbha Pottali preparation?**
   a. Water and salt
   b. Nimbu Svarasa and Saindhava
   c. Rose water and honey
   d. Herbal decoction

68. **How long should the Tamragarbha Pottali Kajjali be triturated with Tamra Bhasma?**
   a. 12 hours b. 24 hours
   c. 48 hours d. 72 hours

69. **What is the main therapeutic indication for Loha Garbha Pottali?**
   a. Shvasa, Kasa, Jvara
   b. Pandu, Sangrahni, Kamala
   c. Kaphaja Janya Tridosha
   d. Shula, Shosha

70. **What is used as the binding agent to shape the Tamragarbha Pottali into its final form?**
   a. Honey b. Ghee
   c. Adaraka Svarasa d. Kumari Svarasa

Answer Sheet

1.	C.	2.	D.	3.	B.	4.	A.	5.	C.	6.	D.	7.	B.	8.	A.				
9.	C.	10.	A.	11.	B.	12.	A.	13.	C.	14.	D.	15.	C.	16.	C.				
17.	B.	18.	B.	19.	B.	20.	C.	21.	A.	22.	B.	23.	B.	24.	B.				
25.	C.	26.	C.	27.	B.	28.	C.	29.	C.	30.	B.	31.	C.	32.	B.				
33.	B.	34.	A.	35.	B.	36.	B.	37.	A.	38.	C.	39.	B.	40.	B.				
41.	A.	42.	D.	43.	C.	44.	D.	45.	A.	46.	B.	47.	B.	48.	C.				
49.	D.	50.	A.	51.	C.	52.	C.	53.	C.	54.	A.	55.	A.	56.	B.				
57.	C.	58.	A.	59.	B.	60.	B.	61.	D.	62.	C.	63.	C.	64.	B.				
65.	B.	66.	B.	67.	B.	68	B.	69.	B.	70.	A.								

Short Question Answer

1. Write the confirmatory tests of kupipakva Rasayana.
2. Vatavidvanshana Rasa.
3. Rasa Karpura.
4. What is probable mode of action of Parparti Kalpana.

Long Question Answer

1. What are the four types of Rasayana described in Chaturvidha Rasayana, and how are they classified?
2. What are the analytical parameters used to evaluate the quality and efficacy of Parpati Kalpana?
3. What is Khalviya Rasayana, and how does contemporary science view the importance of Bhavana in its preparation?
4. What is Pottali Kalpana, how is it classified, what is the general method of its preparation, and what are the specifics of Tamragarbha Pottali?

• • •

13 Current and Emerging Trend in Ayurvedic Pharmaceuticals

• Lecture: 3 hours, non-lecture: 4 hour • • Total Marks- 5 (MCQ- No, SAQ- Yes, LAQ- No) •

Cosmetics-Formulation, Regulatory Provisions

Introduction to Cosmetics-Formulation

The word "cosmetic" is derived from the Greek word "kosmetikos," which means to adorn. In ancient days, any material used for beautification or improvement of appearance was known as a cosmetic.

A cosmetic, as per the Drugs and Cosmetics Act and Rules, 1945, refers to any substance meant for cleansing, protecting, beautifying, enhancing attractiveness, or changing the appearance of the human body or any part thereof, whether applied by rubbing, pouring, sprinkling, spraying, or any other means. Soap is excluded from this definition because it is considered more of a bodily necessity than a cosmetic. Similarly, preparations such as room deodorants are not cosmetics, but if the same deodorant is applied to the body, it is termed a cosmetic. Articles or devices used in applying cosmetics, such as combs, brushes, razor blades, etc., should not be included in cosmetics. Generally, cosmetics are safe for use by almost all people, but adverse reactions may occur in certain individuals when using many cosmetics, such as deodorants, hair shampoos, hair sprays, hair removers, hair dyes, facial creams, skin cleansers, lipsticks, and nail polishes.

Cosmetics serve one of the following functions

1. Maintain body health and hygiene.
2. Avoid premature aging of the skin.
3. Provide a sense of well-being.
4. Improve overall looks and personality.

The raw materials used in the manufacture of cosmetics should be of standard quality and should be tested before use. Only distilled or purified water should be used in the preparation of cosmetics. The dyes used to give color to cosmetics should be approved for FD&C to avoid allergic reactions. The perfumes used should be compatible with other ingredients in the cosmetic preparation.

Classification

This classification helps in under-standing the diverse range of cosmetic products available and their intended use, function, and physical characteristics. Additionally, it aids in regulatory compliance and ensures appropriate marketing and labeling of cosmetic products.

Cosmetics are classified into three main categories:

1. **According to their use:**
   - **Skin Care**: Includes creams, powders, lotions, deodorants, and antiperspirants.
   - **Nail Care**: Such as nail polish, polish removers, and manicure preparations.
   - **Oral Care**: Includes dentifrices and mouth-washes.
   - **Eye Care**: Includes eye creams, lash products, and liners.
   - **Hair Care**: Including shampoos, dyes, tonics, and sprays.

2. **According to their functions:**
   - **Curative or Therapeutic**: Products with medicinal properties like antiperspirants and certain hair preparations.
   - **Protective**: Such as face powders.
   - **Corrective**: Including certain face powders.
   - **Decorative**: Like lipsticks, nail polishes, and mascaras.
3. **According to their physical nature:**
   - **Aerosols**: Such as hair perfumes and after-shave lotions.
   - **Cakes**: Including rouge and makeup compacts.
   - **Emulsions**: Such as vanishing cream, cold cream, and cleansing cream.
   - **Oils**: Such as hair oils.
   - **Pastes**: Like toothpaste and deodorant paste.
   - **Powders**: Including face powder and talcum powder.
   - **Solutions**: Such as after-shave lotions and hand lotions.
   - **Soaps**: Including shaving soap, toilet soap, and shampoo soap.
   - **Sticks**: Like lipsticks and deodorant sticks.

Regulatory Provisions

Cosmetic products are regulated globally to ensure their safety, efficacy, and proper labeling to protect consumer health and prevent misleading claims. Regulatory provisions differ by country or region but share common principles aimed at safeguarding public health.

Definition of Cosmetics

Cosmetic products are generally defined as substances or mixtures intended for application to external parts of the human body (e.g., skin, hair, nails, lips) or to teeth and mucous membranes for cleansing, beautifying, or altering appearance without affecting bodily structure or functions.

Regulatory Framework

- **United States**: Governed by the **Federal Food, Drug, and Cosmetic Act (FDCA)** and enforced by the **Food and Drug Administration (FDA)**.
- **European Union**: Regulated under **Regulation (EC) No 1223/2009**, which is enforced by member state authorities.
- **India**: Regulated under the **Drugs and Cosmetics Act, 1940**, enforced by the **Central Drugs Standard Control Organization (CDSCO)**.
- **Japan**: Governed by the **Pharmaceutical and Medical Device Act (PMDA)**.

Key Regulatory Provisions

- **Product Safety**
  - Manufacturers are responsible for ensuring the safety of cosmetic products before they are marketed.
  - **Toxicological Assessments**: Testing for allergens, irritants, and potential carcinogens.
  - **Prohibited and Restricted Ingredients**: Lists of substances that cannot be used or are restricted in concentration (e.g., mercury, formaldehyde).
- **Good Manufacturing Practices (GMP)**
  - Adherence to GMP ensures consistent production quality and safety.
  - Standards such as ISO 22716 guide the manufacturing process for cosmetics.
- **Labeling Requirements**
  - **Ingredients List**: Must list all components in descending order of concentration using standardized nomenclature (e.g., INCI in the EU).
  - **Warnings and Instructions**: Labels must include warnings about usage and storage.
  - **Claims**: Prohibited from making false or misleading claims (e.g., "cures diseases").
- **Product Registration**
  - In some jurisdictions (e.g., the EU), products must be notified through centralized portals before market entry.
  - Certain countries (e.g., China) require pre-market approval for specific categories of cosmetics.
- **Animal Testing**
  - Many regions, including the EU and India, prohibit animal testing for cosmetics and mandate alternative testing methods.
- **Adverse Event Reporting**
  - Post-market surveillance systems require manufacturers to report adverse events

associated with cosmetic products to regulatory authorities.

- **Nano-materials**
  - Special provisions for the use of nano-materials due to their unique properties, requiring additional safety assessments.

4. **Enforcement and Penalties**
   - Non-compliance may result in product recalls, fines, or bans.
   - Authorities conduct regular inspections and market surveillance to ensure adherence.
5. **Emerging Trends in Regulations**
   - **Sustainability**: Emphasis on environmentally friendly ingredients and packaging.
   - **Clean Beauty**: Growing focus on regulating claims related to "natural" or "organic" cosmetics.
   - **Digital Oversight**: Increased reliance on electronic systems for product registration and monitoring.

Plant Layout and other factory requirements

The layout and design of a cosmetic manufacturing plant must facilitate efficient production, ensure quality control, and comply with regulatory standards (e.g., GMP and ISO guidelines). Below are the key considerations:

1. Plant Layout

- **Zoning and Workflow**
  - **Raw Material Storage:** Dedicated area for raw material storage, segregated by type (liquid, powder, etc.).
  - **Processing Area:** Central space equipped with mixing, heating, emulsification, and filling machinery.
  - **Quality Control (QC) Laboratory:** Separate laboratory for in-process and finished product testing.
  - **Packaging Area:** Space for filling, sealing, and labeling products, close to storage and dispatch areas.
  - **Finished Product Storage:** Dedicated zone for storing packaged products before distribution.
  - **Waste Management Area:** Properly designed area for waste segregation and disposal.
- **B. Material Flow**
  - A linear material flow from raw material storage to finished goods minimizes cross-contamination and improves efficiency.

2. Factory Requirements

- **Infrastructure**
  - **Building Structure:** Cleanable surfaces, adequate lighting, and proper ventilation.
  - **Utilities:**
    - Reliable power supply for equipment and lighting.
    - Hot and cold water supply for cleaning and production.
    - HVAC (Heating, Ventilation, and Air Conditioning) system to maintain controlled environments.
- **Equipment**
  - Mixers, homogenizers, and heating systems.
  - Filling machines for bottles, jars, and tubes.
  - Labeling and sealing equipment.
  - Analytical instruments for QC (e.g., pH meters, viscometers).
- **Environmental Controls**
  - Temperature and humidity control to ensure product stability.
  - Air filtration systems to minimize dust and microbial contamination.
  - Cleanroom standards for sensitive products (e.g., sterile cosmetics).
- **Safety and Hygiene**
  - Dedicated areas for employee changing and handwashing.
  - Use of personal protective equipment (PPE) such as gloves, masks, and hairnets.
  - Sanitation protocols for equipment and workspaces.

3. Regulatory Compliance

- **GMP Standards:** Ensure proper facility design, process validation, and record-keeping.
- **ISO Standards:** For quality management (e.g., ISO 22716 for cosmetics).
- **FDA Guidelines (if applicable):** Adherence to manufacturing and labeling regulations.

4. Personnel Requirements

- Skilled staff for production, quality assurance, and maintenance.
- Training programs on hygiene, equipment use, and GMP standards.

5. Additional Considerations

- **Scalability:** The layout should accommodate future expansions.
- **Waste Management:** Safe disposal systems for hazardous and non-hazardous waste.
- **Energy Efficiency:** Use of energy-saving equipment and sustainable practices.
- This well-organized plant layout and adherence to factory requirements ensure efficient production, compliance, and high-quality cosmetic products.

Process used in the manufacture of Cosmetics

1. **Formulation Development**
   - **Objective**: Create a stable and effective formulation.
   - **Key Steps**:
     - Selection of raw materials.
     - Testing for compatibility and desired effects.
     - Prototype formulation for testing.
2. **Weighing and Mixing of Ingredients**
   - **Process**:
     - Raw materials are accurately weighed according to the formulation.
     - Ingredients are mixed to create a uniform product using high-shear mixers, homogenizers, or agitators.
     - Example: Combining oil and water phases in emulsions like creams and lotions.
3. **Heating and Cooling**
   - **Objective**: Facilitate ingredient solubility and emulsification.
   - **Process**:
     - Heat-sensitive components are added at different stages to avoid degradation.
     - Gradual cooling ensures a stable final texture.
4. **Emulsification (if applicable)**
   - **Objective**: Blend immiscible liquids (e.g., water and oil).
   - **Process**:
     - High-speed emulsifiers or homogenizers create fine, stable emulsions.
     - Example: Used in creams, lotions, and sunscreens.
5. **Milling and Grinding (if applicable)**
   - **Objective**: Achieve uniform particle size for powders or pigments.
   - **Process**:
     - Roll mills or bead mills grind ingredients into fine particles.
     - Example: Lipsticks, eyeshadows, or foundations.
6. **Filling and Packaging**
   - **Process**:
     - The finished product is filled into containers (bottles, tubes, jars) using automated filling machines.
     - Packaging ensures product protection and visual appeal.
     - Example: Lipstick molds, shampoo bottles, or mascara tubes.
7. **Quality Control and Testing**
   - Process:
     - Every batch undergoes microbiological, physical, and chemical tests to ensure compliance with safety and efficacy standards.
8. **Labelling and Distribution**
   - Process:
     - Products are labeled with required regulatory information (ingredients, batch numbers, and usage instructions).
     - Distributed to retailers or customers.
     - These processes ensure the production of high-quality cosmetic products while meeting safety and regulatory standards.

Most commonly used cosmetic Raw materials

1. **Water**
   - Serves as a base and solvent in most cosmetics.
   - Provides hydration and helps dissolve other ingredients for better formulation.
2. **Emollients**
   - Examples: Glycerin, Shea Butter, Coconut Oil.

- Soften and moisturize the skin, enhancing product spreadability.

3. **Emulsifiers**
   - Examples: Cetyl Alcohol, Stearic Acid, Polysorbates.
   - Help blend oil and water phases in creams and lotions.
4. **Preservatives**
   - Examples: Parabens, Phenoxyethanol, Benzyl Alcohol.
   - Prevent microbial growth, ensuring product longevity and safety.
5. **Colorants and Fragrances**
   - Colorants: Titanium Dioxide, Iron Oxides for pigmentation.
   - Fragrances: Natural essential oils or synthetic scents to enhance sensory appeal.

Control of microbial contamination in the manufacture of cosmetics:

Cosmetic Products

Cosmetics are formulations designed for application to the skin, mucous membranes, or external body surfaces (Blanchin et al., 2007). These products typically contain essential ingredients such as water, thickeners, pigments, emulsifiers, preservatives, glitters, and fragrances (Tazeen et al., 2023).

Microbiological Safety in Cosmetics

The microbiological safety of cosmetics is a crucial factor in ensuring product quality. While sterility is not mandatory for all cosmetics, consumer safety must always be a top priority (Dimri, 2022). Products undergo microbiological durability and stability testing before commercial release to mitigate risks of bacterial contamination, particularly in raw materials of natural origin (Elmorsy and Hafez, 2016). Good Manufacturing Practices (GMP) and stringent Quality Control (GQC) procedures are essential to minimize contamination (Siegert, 2016).

Risks in Customized and Freshly Made Cosmetics

Customized cosmetics, often made in stores without specialized facilities, are particularly prone to contamination from handlers, equipment, or the environment. Cross-contamination during manufacturing or transfer to containers is another significant risk. Moreover, a pH value above 10 does not necessarily guarantee reduced microbial counts in freshly made products (Kim et al., 2020).

Pathogens Commonly Found in Contaminated Cosmetics

Cosmetic products can harbor various harmful microorganisms, including:

a. **Bacteria**: Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, Enterobacter gergoviae.

b. **Fungi**: *Candida albicans*, *Rhodotorula spp.*, and *Penicillium spp.* (Neza and Centini, 2016).

Heat treatment is a critical step in controlling these pathogens during production (Kim et al., 2020).

Cosmetic Classification by Safety Standards

The Scientific Committee on Consumer Safety (SCCS) categorizes cosmetics into two groups:

- **Category 1**: Products for children under three, mucous membranes, or around the eyes.
- **Category 2**: All other cosmetics.

Both categories have strict microbiological limits, prohibiting certain pathogens like Staphylococcus aureus and E. coli entirely (SCCS, 2015).

Vulnerable Populations

Certain groups, such as children under three, older adults, and individuals with compromised immune systems, are more susceptible to infections caused by contaminated cosmetics. Even minor skin or mucous membrane damage can increase the risk of infection.

Types of Contamination in Cosmetic Products

- **Fungal Contamination**: Found in creams, powders, and mascaras, with high solute concentrations or frequent air exposure contributing to contamination (Dadashi and Dehghanzadeh, 2016).
- **Bacterial Contamination**: More common in products with high moisture content, such as shampoos, creams, and lip gloss (Elmorsy and Hafez, 2016).

Regulations and Recalls

The SCCS oversees cosmetic safety in Europe, with non-conforming products reported in the RAPEX database. Between 2005 and 2018, 104 cosmetics with microbiological risks were recorded, with *Pseudomonas aeruginosa* being the most frequently identified contaminant (Michalek et al., 2019).

Quality Control of cosmetics

Introduction

Quality control (QC) in the cosmetics industry ensures that products meet safety, efficacy, and aesthetic standards before reaching consumers. QC measures are vital to guarantee that cosmetic products are free from contaminants, stable under normal usage conditions, and compliant with regulatory standards.

Key Aspects of Quality Control in Cosmetics

1. **Raw Material Testing**
   - Ensures the purity and quality of raw materials used in production.
   - Tests for microbial contamination, chemical composition, and physical properties.
   - Verification of Certificates of Analysis (CoA) from suppliers.
2. **Microbiological Testing**

   Critical to prevent microbial contamination that can lead to product spoilage or consumer health risks.

   Common tests include:
   - Total microbial count.
   - Pathogen-specific testing (e.g., Escherichia coli, Staphylococcus aureus).
   - Preservative efficacy testing (PET) to ensure long-term microbial stability.
3. **Physical and Chemical Testing**
   - **pH Testing**: Ensures compatibility with skin and product stability.
   - **Viscosity Testing**: Verifies the texture and consistency of the product.
   - **Appearance**: Checks for color, clarity, and uniformity.
   - **Stability Testing**: Evaluates the product under various conditions, such as temperature, light, and humidity, to ensure durability over its shelf life.
4. **Packaging Integrity**
   - Tests to ensure that packaging materials protect the product and maintain its quality.
   - Verifies the compatibility of the product with its packaging.
   - Checks for leakage, durability, and labeling accuracy.
5. **Sensory Evaluation**
   - Assessments for fragrance, texture, and visual appeal to meet consumer expectations.
   - Panel testing is often conducted for subjective evaluation.
6. **Regulatory Compliance**
   - Adherence to guidelines from regulatory authorities like the FDA, EU Cosmetics Regulation, or ISO standards.
   - Prohibition of harmful substances (e.g., lead, parabens in certain concentrations).
   - Documentation of safety assessments for each product batch.
7. **Batch Testing and Release**
   - Random sampling of each batch for comprehensive testing before market release.
   - Includes analytical, microbiological, and stability tests.
   - Ensures uniformity and safety across all production lots.

Conclusion

Effective quality control is a cornerstone of the cosmetics industry, ensuring that products are safe, effective, and aesthetically pleasing. It protects consumers, enhances brand reputation, and ensures compliance with global standards.

Skin Sensitization Sensitivity Testing

Introduction

Skin sensitization testing plays a critical role in identifying substances that may cause allergic contact dermatitis (ACD). The evolution of testing methods reflects a balance between scientific advancements, regulatory requirements, and ethical considerations. From early diagnostic patch tests to the adoption of New Approach Methods (NAMs), the journey highlights significant progress in ensuring safety while reducing reliance on animal testing. This article explores the historical

development, innovative methodologies, and future directions of skin sensitization testing.

1. Historical Context and Early Testing

ACD was recognized as a clinical issue long before the advent of predictive testing methods.

The late 19th century saw the emergence of diagnostic patch testing, marking the inception of skin sensitization assessments.

2. Development of Guinea Pig and Mouse Models

Guinea pig-based assays, such as the Guinea Pig Maximization Test (GPMT) and Buehler Test (BT), played a pivotal role but lacked validation and often produced inconsistent results.

The introduction of the Local Lymph Node Assay (LLNA) in the 1990s brought significant improvements, including reduced animal usage, quantitative endpoints, and reliable dose-response data.

3. Advances in Non-Animal Methods (NAMs)

Regulatory frameworks like the EU's REACH and Cosmetics Regulation have prioritized non-animal testing methods.

NAMs, including in vitro and in silico techniques, leverage insights into the adverse outcome pathway (AOP) of skin sensitization to identify potential allergens without animal models.

4. Integration and Innovation in Risk Assessment

NAMs are increasingly refined to predict both hazard and potency, using tools like OECD-approved assays (e.g., DPRA, KeratinoSens™) and advanced statistical models.

Integrated approaches generate Point of Departure (PoD) values, enhancing precision in risk assessments and supporting regulatory decisions.

5. Challenges and Future Directions

Variability in global regulations and the complexity of evaluating chemical mixtures present ongoing challenges.

Future progress hinges on developing harmonized guidelines, curating comprehensive datasets, and integrating diverse testing approaches for more robust safety evaluations.

Conclusion

The field of skin sensitization testing has witnessed remarkable advancements, from traditional animal models to cutting-edge NAMs. These innovations have not only enhanced testing accuracy but also aligned with ethical imperatives to minimize animal use. As regulatory frameworks evolve and scientific tools improve, the future holds promise for more consistent, reliable, and humane approaches to skin sensitization assessment, ensuring better protection for both humans and the environment.

In vitro-Tests for Skin Irritation

Quality Control of Raw materials

Quality control of raw materials is a critical process that ensures the inputs used in manufacturing meet the desired standards and requirements. This process involves detailed analysis and evaluation to ensure the materials are suitable for their intended use, maintain production quality, and meet regulatory compliance. The quality control process can be divided into the following detailed stages:

1. **Supplier Search:** The process begins with identifying potential suppliers who can reliably provide raw materials of the required quality. This involves evaluating the supplier's reputation, certifications, and track record. Considerations include the supplier's ability to meet delivery schedules, adherence to quality standards, and responsiveness to inquiries or complaints.
2. **Procurement:** Once a suitable supplier is identified, the next step is procurement. This involves negotiating terms, including price, quantity, delivery schedules, and quality assurance. Clear agreements regarding quality specifications and inspection protocols should be established to avoid disputes later.
3. **Storage:** Proper storage of raw materials is crucial to preserving their quality until they are used in production. Factors such as temperature, humidity, light exposure, and shelf life must be carefully managed. Specialized storage facilities may be required for sensitive materials to prevent degradation or contamination.
4. **Quality Testing:** After receiving the raw materials, they must undergo rigorous testing to confirm compliance with predefined standards. These tests can vary depending on the type of material and its intended use, such as physical, chemical, or microbiological analysis.
5. **Simulated Application Tests:** Beyond basic quality testing, raw materials must be evaluated in conditions that simulate real-life production scenarios. This step ensures that the material performs as expected under actual manufacturing conditions. For example, adhesives might be tested for bonding strength, or food ingredients for taste and texture in the final product.
6. **Data Analysis:** The results of these tests are analyzed to determine if the raw material meets the required specifications. Any deviations are documented, and corrective actions are initiated, such as rejecting the batch or contacting the supplier for clarification.
7. **Comprehensive Evaluation:** The final stage involves a detailed review of the raw materials' overall performance and quality. This includes compiling all test results and comparing them against industry standards and internal benchmarks. The goal is to assess whether the materials consistently meet the necessary quality requirements for production.
8. **Supplier Communication:** Engaging in open and transparent communication with suppliers is vital at this stage. Share the test results with suppliers and seek additional information

Conclusion

The quality control of raw materials is a meticulous process that involves collaboration, rigorous testing, and proactive communication. By following these stages—supplier search and storage, testing and evaluation, and final quality assessment—manufacturers can ensure the consistent quality of raw materials, reduce production risks, and maintain the integrity of their end products. This systematic approach not only enhances production efficiency but also upholds customer satisfaction and regulatory compliance.

Intermediates and Finished Products

a. Intermediate Products

Intermediate products, also known as intermediate goods, are items like raw materials, parts, components, and semi-finished products that are used as inputs in the production of other goods and services. These products are not designed for direct consumption but are essential for businesses to create final products.

b. Finished Products

Finished products, or finished goods, are the completed items that have passed through all stages of production, including assembly and quality assurance. These goods are ready for sale and can be found either in warehouses awaiting distribution or on store shelves, available for purchase by customers.

Stability of Cosmetics

Introduction

Stability testing ensures that cosmetic products maintain their physical, chemical, microbiological quality, functionality, and aesthetics under appropriate storage conditions. Given the short development cycles and frequent product launches, manufacturers must implement efficient and cost-effective testing programs tailored to their needs. This guideline provides a framework for selecting and refining stability tests, ensuring products remain stable in the market while allowing flexibility to address unique formulations and emerging technologies.

Aim

- This document provides guidelines to predict and ensure the stability of cosmetic products in the marketplace.
- It aims to assist manufacturers in selecting and refining appropriate stability tests.
- The guidelines serve as a helpful starting point for stability evaluation.
- Manufacturers should thoroughly evaluate new products and technologies.
- Testing methods should be adapted to account for variations in product types and formulations.

Stability Testing

1. **Subjective Changes:** These are alterations that influence a patient's sensory or physiological perception of the product. Examples include

variations in color, odor, size, shape, consistency, or overall appearance of the drug.

2. **Physical Changes:** These involve modifications to the physical state or composition of the drug molecules. Examples include polymorphic transformations, precipitation, sublimation, evaporation, condensation, or crystallization.
3. **Chemical Changes:** These refer to alterations in the molecular structure of the drug. Examples include reactions such as oxidation, hydrolysis, or chelation.
4. **Microbiological Changes:** These occur due to the proliferation of microorganisms within the product formulation, leading to contamination by bacteria or fungi.

Protocol of Stability Studies

Conditions	Minimum Time Period At Submission
Long-term testing 25°C...2°C/60%....5% Rh	12 month
Accelerated testing 40°C +2°C/75% ±5% Rh	6 month
Alternate testing 30°C +2°C/65% ±5% Rh	12 month

Permissible Limits of Microbial load and pathogens as per WHO

Sr. No.	Microbial load	Plant material for internal use
1	Total viable Aerobic count	< 105 cfu g-1
2	Total Yeast & Mould count	< 103 cfu g-1
3	E.coli	< 10 g-1
4	Total Enterobacteriaceae	< 103 cfu g-1

Dosage Form and Cosmetic Products

Introduction of Different Dosage Form

A drug is a substance designed for use in the diagnosis, mitigation, treatment, cure, or prevention of diseases in humans or animals. However, drugs are seldom given in their pure form. Instead, they are administered in various dosage forms, which are created by combining the drug with other substances known as "additives." These additives serve multiple purposes:

1. **Formulation Shape**: Additives help to create a specific shape for the drug, making it easier to handle, administer, and consume. For instance, tablets, capsules, and syrups all have distinct shapes and consistencies that facilitate their use.
2. **Stability Enhancement**: Many drugs can degrade over time due to factors such as light, heat, and moisture. Additives can enhance the stability of the drug, protecting it from degradation and thereby extending its shelf life.
3. **Palatability Improvement**: Drugs often have a bitter or unpleasant taste. Additives can mask these tastes, making the medication more palatable and increasing the likelihood of patient compliance, especially in children.
4. **Aesthetic Appeal**: The appearance of a drug can influence patient perception and compliance. Additives can improve the color, texture, and overall appearance of the medication, making it more attractive and acceptable to users.

In summary, the incorporation of additives into drug formulations is essential for creating effective, stable, and user-friendly medications. These additives ensure that the drug is not only therapeutically effective but also easy and pleasant to use.

Importance of Dosage Forms

Transforming a drug into various dosage forms is crucial for several reasons:

1. **Accurate and Safe Dosage Delivery**: Dosage forms ensure that the patient receives the correct amount of the drug in a safe and convenient manner. This helps to prevent under-dosing or overdosing, which can lead to ineffective treatment or adverse effects, respectively.
2. **Easy Identification**: Many dosage forms can be easily recognized by their distinct color, shape, or identifying markings. This helps in avoiding medication errors and ensures that patients and healthcare providers can easily distinguish between different medications.
3. **Protection from Environmental Factors**: Some drugs are susceptible to degradation due to oxidation, hydrolysis, or reduction. Dosage forms like coated tablets and sealed ampoules protect the drug from these environmental factors, thus maintaining the drug's efficacy and shelf life.

4. **Protection from Gastric Juices**: Certain drugs can be destroyed or inactivated by the acidic environment in the stomach. Enteric-coated tablets are designed to resist the acidic gastric juices and dissolve only in the more neutral environment of the intestines, ensuring the drug reaches its site of action intact.
5. **Taste and Odor Masking**: Many drugs have a bitter, salty, or otherwise unpleasant taste or odor. Dosage forms such as capsules, coated tablets, and flavored syrups mask these undesirable characteristics, making the medication more palatable and improving patient compliance, especially among children.
6. **Insertion into Body Cavities**: Some drugs are administered through body cavities for local or systemic effects. Dosage forms like rectal or vaginal suppositories are designed for this purpose, ensuring that the drug is delivered directly to the site of action or absorbed through the mucous membranes.
7. **Inhalation Therapy**: For drugs intended to act on the respiratory system or to provide rapid systemic effects, inhalation therapy is often used. Dosage forms such as inhalation aerosols and inhalants allow the drug to be delivered directly to the lungs, providing quick onset of action and targeted delivery.
8. **Maximum Drug Action from Topical Administration Sites**: Dosage forms like creams, ointments, ophthalmic preparations, and ENT (Ear, Nose, and Throat) preparations are designed for application directly to the skin or mucous membranes. This method ensures that the drug acts directly at the site of application, providing targeted therapeutic effects and minimizing systemic side effects.
9. **Sustained Release Action through Controlled Release Mechanisms**: Sustained release tablets, capsules, and suspensions are formulated to release the drug gradually over an extended period. This helps maintain a consistent drug concentration in the bloodstream, enhancing therapeutic effectiveness and reducing the need for frequent dosing.
10. **Liquid Dosage Forms for Drugs Soluble in Suitable Vehicles**: Solutions are liquid dosage forms where the drug is fully dissolved in a solvent. This form ensures uniform distribution of the drug and is ideal for patients who have difficulty swallowing solid dosage forms or require rapid drug absorption.
11. **Liquid Preparations for Drugs Insoluble or Unstable in Different Vehicles**: Suspensions are liquid formulations where the drug particles are dispersed in a liquid medium but not dissolved. This type of dosage form is used for drugs that are insoluble or unstable in solvents, ensuring that the drug remains effective while providing an alternative to solid dosage forms.

In summary, the transformation of drugs into various dosage forms is essential for ensuring accurate dosing, easy identification, and protection from environmental and bodily factors, improved palatability, and effective delivery through different routes of administration. These considerations enhance the overall effectiveness and acceptability of the medication.

Principles of Dosage Form Design

These principles provide guidelines for developing pharmaceutical formulations that effectively, safely, and conveniently deliver drugs to patients:

1. **Bio pharmaceutics and Pharmacokinetics**: Understanding the drug's solubility, permeability, and stability, as well as its absorption, distribution, metabolism, and excretion, helps determine the appropriate route of administration, dosage regimen, and release kinetics.
2. **Patient-Centered Approach**: Formulations should be user-friendly, pleasant-tasting (if applicable), and tailored to meet the needs of different patient populations (e.g., children, elderly) to enhance compliance and treatment outcomes.
3. **Route of Administration**: Selecting the suitable route (oral, parenteral, topical, inhalation) based on the drug's properties and desired therapeutic effect is crucial.
4. **Release Kinetics**: Controlling drug release profiles (immediate-release, sustained-release, targeted -release) is essential for achieving optimal pharmacokinetic behavior and therapeutic effects.

5. **Excipient Selection and Compatibility**: Excipients must aid in drug delivery, improve stability, and provide desirable formulation characteristics while being compatible with the drug and other excipients to ensure a stable, effective formulation.
6. **Manufacturing and Quality Control**: Robust manufacturing processes and strict quality control measures ensure consistency, reproducibility, and regulatory compliance.
7. **Safety and Tolerability**: Prioritizing patient safety by minimizing adverse effects and toxicity, considering the excipients' safety profile, and the route of administration.
8. **Stability and Shelf-Life**: Proper formulation and packaging are necessary to maintain drug stability throughout its shelf life, considering factors like temperature, humidity, and light sensitivity.
9. **Cost-Effectiveness**: Designing cost-effective dosage forms ensures affordable and accessible medications without compromising quality and efficacy.
10. **Emerging Technologies and Personalized Medicine**: Innovations such as nanotechnology, 3D printing, and personalized medicine based on patient characteristics and genetic profiles are shaping the future of pharmaceutical formulations.

Primary Reasons for Designing a Dosage Form

1. **Protection**:
   - **Environmental Protection**: Shield medications from air, oxygen, temperature, and humidity (e.g., coated tablets, capsules, ampoules).
   - **Gastric Protection**: Prevent acid-labile medications from degrading in the stomach due to gastric acid (e.g., enteric-coated tablets).
   - **Chemical Stability**: Ensure the stability of drugs by preventing chemical interactions.
   - **Microbial Contamination**: Design dosage forms to prevent contamination, maintaining drug safety and efficacy.
   - **Mechanical Protection**: Make dosage forms (e.g., tablets with protective coatings) resilient to physical stress during handling and transportation.
   - **Inhalation Protection**: Ensure metered-dose inhalers and dry powder inhalers protect the medication during administration.
   - **Parenteral Protection**: Maintain sterility and avoid contamination in parenteral dosage forms (e.g., ampoules, vials).
2. **Improve Therapeutic Activity**:
   - **Targeted Action**: Deliver the drug to the intended site (e.g., transdermal patches, ointments).
   - **Direct Insertion**: Administer medications into body orifices (e.g., rectal, vaginal suppositories).
   - **Optimal Drug Action**: Achieve the best drug action in tissues or the bloodstream (e.g., injections, inhalants).
   - **Prolonged Release**: Provide controlled release administration for sustained therapeutic effects.
   - **Increased Bioavailability**: Enhance the absorption of medications with a narrow absorption window (e.g., gastro retentive formulations).
3. **Patient Compliance**:
   - **Unit Dose**: Ensure dose accuracy (e.g., tablets, capsules).
   - **Reduced Dosage Frequency**: Lower the frequency of dosing (e.g., prolonged release, sustained release).
   - **Masking Taste/Odor**: Improve the palatability of medicines (e.g., film-coated tablets, capsules, suspensions).
   - **Easy Administration**: Facilitate administration and handling (e.g., chewable tablets, liquid forms for children).

By adhering to these principles, pharmaceutical dosage forms are designed to meet patient needs, optimize drug delivery, and improve therapeutic outcomes, ensuring patient well-being and treatment efficacy.

Classification of Dosage Forms

Dosage forms can be classified based on the physical form of the final product. The main categories are:

1. Solid Dosage Forms

Solid dosage forms are those in which the drug is in a solid state. These forms are highly stable, convenient for storage and transportation, and allow for precise dosing. Common solid dosage forms include:

Tablets

- **Compressed Tablets**: Simple tablets formed by compressing the drug and additives.
- **Coated Tablets**: Tablets covered with a coating to protect the drug, mask taste, or control release.
- **Effervescent Tablets**: Contain ingredients that release gas when in contact with water, aiding in drug dissolution.
- **Chewable Tablets**: Designed to be chewed before swallowing, often flavored to improve palatability.
- **Sublingual Tablets**: Placed under the tongue for rapid absorption into the bloodstream.
- **Buccal Tablets**: Placed between the gum and cheek for absorption through the mucous membranes.

Capsules

- **Hard Gelatin Capsules**: Contain dry, powdered ingredients or mini-pellets enclosed in a hard gelatin shell.
- **Soft Gelatin Capsules**: Contain liquid or semi-solid drugs enclosed in a soft, flexible gelatin shell.

Powders and Granules

- **Bulk Powders**: Drugs in a powdered form intended to be measured and mixed with liquid before administration.
- **Granules**: Larger, agglomerated particles often used in sachets or as an intermediate for tablet production.

Lozenges and Pastilles

- **Lozenges**: Solid preparations that dissolve slowly in the mouth, delivering the drug locally or systemically.
- **Pastilles**: Soft, chewable, or gummy solid dosage forms, often used for throat medications.

Others

- **Pills**: An older form of solid dosage, typically spherical.
- **Troches**: Compressed or molded discs that dissolve slowly in the mouth.
- **Implants**: Small, sterile, solid forms placed under the skin for long-term drug release.

2. Liquid Dosage Forms

Liquid dosage forms consist of a drug dissolved or suspended in a suitable liquid medium. These forms are particularly useful for patients who have difficulty swallowing solids and can provide rapid drug absorption. Common liquid dosage forms include:

Solutions

- **Oral Solutions**: Drugs dissolved in a suitable solvent for oral administration.
- **Syrups**: Concentrated aqueous preparations of sugar or sugar substitute containing the drug.
- **Elixirs**: Clear, sweetened, hydroalcoholic solutions for oral use.
- **Tinctures**: Alcoholic or hydroalcoholic solutions prepared from plant or chemical substances.
- **Drops**: Highly concentrated solutions administered in small volumes, often using a dropper.

Suspensions

- **Oral Suspensions**: Finely divided drug particles suspended in a liquid medium for oral administration.
- **Topical Suspensions**: Suspensions applied to the skin for local action.

Emulsions

- **Oral Emulsions**: Mixtures of two immiscible liquids, one dispersed in the other, for oral administration.
- **Topical Emulsions**: Emulsions applied to the skin, often used in creams and lotions.

Injections

- **Intravenous (IV)**: Direct injection into a vein.
- **Intramuscular (IM)**: Injection into a muscle.
- **Subcutaneous (SC)**: Injection under the skin.
- **Intradermal (ID)**: Injection into the dermis layer of the skin.

Other Liquid Forms

- **Inhalations**: Solutions or suspensions administered through inhalation.
- **Enemas**: Solutions or suspensions introduced into the rectum.

- **Gargles and Mouthwashes**: Solutions intended for rinsing the mouth or throat.

3. Semi-Solid Dosage Forms

Semi-solid dosage forms are intended for topical application to the skin or mucous membranes. They combine the properties of both solid and liquid dosage forms, providing localized or systemic drug action. Common semi-solid dosage forms include:

❖ **Ointments**
- **Hydrocarbon Base**: Greasy, occlusive preparations used for moisturizing.
- **Absorption Bases**: Allow incorporation of aqueous solutions to form w/o emulsions.
- **Water-Removable Bases**: Non-greasy, easy-to-remove bases forming o/w emulsions.
- **Water-Soluble Bases**: Non-greasy bases that are completely water-soluble.

❖ **Creams**
- **Oil-in-Water (O/W) Creams**: Non-greasy creams used for hydrating the skin.
- **Water-in-Oil (W/O) Creams**: Greasier creams providing an emollient effect.

❖ **Gels**
- **Hydrogels**: Contain water and provide a cooling effect.
- **Organogels**: Contain an organic liquid phase.

❖ **Pastes**

Stiffer than ointments: Contain a higher proportion of solid material, providing a protective layer.

❖ **Others**
- **Suppositories**: Solid dosage forms designed to melt at body temperature, administered rectally or vaginally.
- **Pessaries**: Similar to suppositories but specifically for vaginal administration.
- **Plasters**: Semi-solid preparations applied to a backing material for prolonged contact with the skin.

In summary, the classification of dosage forms into solid, liquid, and semi-solid categories helps in understanding their distinct characteristics, applications, and advantages in drug delivery.

Advantages and Disadvantages of Currently Available Dosage Forms

Each dosage form has its own set of advantages and disadvantages, making it suitable for specific medical conditions, patient needs, and drug properties. The choice of dosage form is crucial for optimizing therapeutic outcomes, patient compliance, and overall treatment effectiveness.

1. Oral Dosage Forms

Tablets and Capsules

❖ **Advantages**:
- Convenient and easy to administer.
- Accurate dosing.
- Long shelf life.
- Generally stable and easy to manufacture.

❖ **Disadvantages**:
- Not recommended for individuals with swallowing challenges.
- Delayed onset of action compared to injectable forms.
- Possible gastrointestinal irritation.
- Variable absorption due to first-pass metabolism.

Liquids (Solutions, Suspensions, Syrups)

❖ **Advantages**:
- Easier to swallow for children and elderly patients.
- Faster absorption and onset of action compared to solid forms.
- Flexible dosing.

❖ **Disadvantages**:
- Less stable than solid forms.
- Shorter shelf life.
- Potential for dose inaccuracy.
- Often require preservatives.

2. Topical Dosage Forms

Creams, Ointments, Gels

❖ **Advantages**:
- Direct application to the site of action.
- Reduced systemic side effects.
- Suitable for patients who cannot take oral medications.

❖ **Disadvantages**:
- Messy and inconvenient to apply.
- Limited to local effects.
- Possible skin irritation or allergic reactions.

Transdermal Patches

❖ **Advantages**:
- Sustained and controlled release of medication.
- Avoids first-pass metabolism.
- Convenient and improves patient compliance.

❖ **Disadvantages**:
- Skin irritation or allergic reactions.
- Limited to drugs that are effective at low doses.
- Slow onset of action.

3. Parenteral Dosage Forms

Injectables (Intravenous, Intramuscular, Subcutaneous)

❖ **Advantages**:
- Rapid onset of action.
- Suitable for drugs that are poorly absorbed orally.
- Precise control over drug levels in the bloodstream.

❖ **Disadvantages**:
- Invasive and may induce discomfort or pain.
- Requires sterile techniques and trained personnel.
- Higher risk of infection.
- More expensive to manufacture and administer.

4. Inhalation Dosage Forms

Aerosols, Dry Powder Inhalers, Nebulizers

❖ **Advantages**:
- Quick absorption via the respiratory tract.
- Direct delivery to the lungs, useful for respiratory conditions.
- Reduced systemic side effects.

❖ **Disadvantages**:
- Technique-dependent, requiring proper usage for effectiveness.
- Irritation of the respiratory tract.
- Limited to drugs suitable for inhalation.

5. Rectal and Vaginal Dosage Forms

Suppositories, Creams, Gels

❖ **Advantages**:
- Useful for patients who cannot take oral medications.
- Bypasses first-pass metabolism.
- Local and systemic effects.

❖ **Disadvantages**:
- Inconvenient and discomforting for certain patients.
- Variable absorption.
- Limited patient acceptance.

6. Sublingual and Buccal Dosage Forms

Tablets, Films, Sprays

❖ **Advantages**:
- Rapid onset of action.
- Bypasses first-pass metabolism.
- Convenient and easy to administer.

❖ **Disadvantages**:
- Limited to drugs that are effective at low doses.
- Potential for irritation of the oral mucosa.
- Unpleasant taste for some formulations.

Modification of Classical Ayurveda Dosage

Adaptations and alterations are essential for the advancement of any field of science, enabling it to ascend to new levels of achievement. Ayurveda has multiple effective basic formulations for treating various diseases and disorders, but challenges such as limited shelf life and poor palatability pose significant hurdles to the administration of these drugs. Suitable dosage forms are required to protect the drug from the adverse effects of atmospheric changes and gastric acid during oral administration, to mask the bitter taste and foul odor, and to provide extended drug action through controlled release mechanisms. To use these formulations effectively in the present era, they require modifications into new dosage forms that enhance shelf life and palatability, suiting patients' needs without compromising the underlying basic principles.

Key Areas for Modification

Primary preparations are mainly modified for:

1. **Increasing Palatability**: Making the formulations more pleasant to taste.
2. **Extending Shelf Life**: Enhancing the stability and longevity of the formulations.
3. **Achieving Global Acceptance**: Ensuring the formulations meet international standards.
4. **Ease of Administration**: Making the dosage forms simpler and more convenient to use.
5. **Dose Fixation**: Ensuring accurate and consistent dosing.

Benefits of Modifications

Modifying traditional Ayurveda formulations into new dosage forms helps achieve public acceptance by:

1. Enhancing the appearance and form of the drugs.
2. Improving palatability.
3. Increasing shelf life.
4. Enhancing therapeutic utility or potency.
5. Simplifying dispensing.
6. Improving portability

Techniques and Additives for Modification

The following agents can be added to achieve effective modifications:

1. **Suitable Vehicles**: Used to dissolve or suspend drugs, mask bad taste, and potentiate the drug. These are used in Bhavana (impregnation), cooking drugs, and Anupana (vehicle for drug administration).
2. **Harmless Coloring Agents**: Make the drugs more visually acceptable.
3. **Sweetening Agents**: Such as cane sugar, used in syrups to make them palatable, particularly for conditions like Paittika Vikara (disorders related to Pitta dosha), and suitable for pediatric use.
4. **Flavoring Agents**: Mask undesirable tastes, textures, smells, and appearances. The addition of ingredients like Trijata (a combination of three aromatic substances) and Chaturjata (a combination of four aromatic substances) enhances the taste and smell.

By incorporating these modifications, traditional Ayurvedic formulations can be adapted to meet modern needs and preferences, thereby increasing their efficacy, acceptability, and therapeutic value.

Route of Drug Administration

The route of drug administration refers to the method by which medications are introduced into the body to achieve therapeutic effects. There are various routes, including oral (by mouth), topical (applied to the skin), injection (directly into the body), inhalation (via the respiratory system), rectal, sublingual/buccal (under the tongue or between the cheek and gum), transdermal (through the skin), and intranasal (via the nose). Each route has its advantages and disadvantages, impacting factors such as the onset of action, bioavailability, patient compliance, and ease of administration. The selection of the appropriate route depends on factors such as the drug's properties, the patient's condition, desired therapeutic outcomes, and patient preference. Understanding the different routes of drug administration is crucial for healthcare professionals to ensure safe and effective medication delivery.

Different Routes of Drug Administration

1. Oral Route

This is the most common route, where drugs are ingested through the mouth and absorbed through the gastrointestinal tract. It includes tablets, capsules, liquids, and powders. Advantages include ease of administration and patient compliance. However, absorption can be variable due to factors like stomach acidity, food interactions, and first-pass metabolism in the liver.

Advantages

1. **Convenience**: Administering oral medications is straightforward and does not necessitate specialized training.
2. **Patient Compliance**: Many patients find it easier to take medications orally, leading to better adherence to treatment regimens.
3. **Absorption**: Some drugs are well absorbed through the gastrointestinal tract, leading to predictable and consistent blood levels.
4. **Versatility**: Various dosage forms are available for oral administration, including tablets, capsules, liquids, and powders, accommodating different patient needs.

Disadvantages

1. **Variable Absorption**: Absorption of oral medications can be affected by factors like food, pH of the stomach, and gastrointestinal motility, leading to variable blood levels.
2. **First-pass Metabolism**: Drugs absorbed orally may undergo extensive metabolism in the liver before reaching systemic circulation, reducing their bioavailability.
3. **Irritation**: Some medications can irritate the gastrointestinal tract, causing symptoms like nausea, vomiting, or gastric irritation.
4. **Inconvenience for Certain Patients**: Patients with swallowing difficulties, nausea, or vomiting may find it challenging to take medications orally.
5. **Slow Onset of Action**: Oral medications may have a slower onset of action compared to other routes, such as injection or inhalation, which provide more rapid effects.

2. Topical Route

Medications are applied directly to the skin or mucous membranes for local effects. This includes creams, ointments, gels, and patches. It's effective for skin conditions, pain relief, and localized treatments. Absorption rates vary depending on skin thickness, hydration, and blood flow to the area.

Advantages

1. **Localized Effect**: Topical medications are applied directly to the affected area, providing targeted therapy and minimizing systemic exposure.
2. **Reduced Systemic Side Effects**: By bypassing the digestive system and avoiding first-pass metabolism in the liver, topical medications can reduce systemic side effects.
3. **Convenient Application**: Topical medications are often easy to apply and can be self-administered by patients, increasing convenience and adherence to treatment regimens.
4. **Controlled Dosing**: Topical formulations allow for precise dosing, enabling healthcare providers to adjust medication amounts according to individual patient needs.
5. **Potential for Extended Release**: Certain topical formulations, such as patches, can provide sustained drug release over an extended period, reducing the frequency of application.

Disadvantages

1. **Variable Absorption**: Absorption of topical medications can be inconsistent and influenced by factors such as skin integrity, hydration, and the presence of occlusive dressings.
2. **Limited Penetration**: Some medications may have difficulty penetrating the skin barrier, limiting their effectiveness in treating deeper tissues or systemic conditions.
3. **Skin Irritation**: Topical medications may cause skin irritation, allergic reactions, or sensitization in some individuals, leading to discomfort or adverse effects.
4. **Potential for Contamination**: Improper application or handling of topical medications can increase the risk of contamination, infection, or unintended exposure to others.
5. **Limited Use for Systemic Conditions**: While effective for localized conditions, the topical route may not be suitable for treating systemic diseases or conditions requiring widespread drug distribution throughout the body.

3. Injection Route

Drugs are introduced into the body via injection. This route offers rapid onset of action and precise dosing. It includes subcutaneous (under the skin), intramuscular (into muscle), and intravenous (into a vein) injections. Intravenous injections provide immediate effects, while subcutaneous and intramuscular injections offer sustained release.

Advantages

1. **Rapid Onset of Action**: Injections provide a faster onset of action compared to oral medications, making them ideal for emergency situations or when immediate therapeutic effects are needed.
2. **Precise Dosage**: Injections allow for precise dosing, ensuring accurate delivery of medication into the body.
3. **Bypassing First-Pass Metabolism**: Injected drugs bypass the digestive system and liver metabolism, leading to higher bioavailability compared to oral administration.
4. **Predictable Blood Levels**: Injection route often results in consistent and predictable blood levels of medications, optimizing therapeutic outcomes.

5. **Suitable for Non-Oral Administration**: Injections are useful for patients who are unable to take medications orally due to factors such as nausea, vomiting, or impaired gastrointestinal function.

Disadvantages

1. **Invasive Procedure**: Injections require piercing the skin with a needle, which can be uncomfortable or painful for patients and may cause anxiety.
2. **Risk of Infection**: Injection site infections can occur, especially if proper aseptic techniques are not followed during administration.
3. **Tissue Damage**: Improper injection technique or repeated injections at the same site can lead to tissue damage, scarring, or localized reactions.
4. **Specialized Training Required**: Administration of injections requires proper training and skills to ensure safety and effectiveness.
5. **Potential for Adverse Reactions**: Some patients may experience adverse reactions, such as allergic reactions or injection site pain, swelling, or redness.

4. Inhalation Route

Medications are administered through inhalation into the respiratory system. This route is used for conditions like asthma, COPD, and respiratory infections. It allows for rapid absorption into the bloodstream via the lungs. Inhalers, nebulizers, and vaporizers are common delivery devices.

Advantages

1. **Rapid Onset of Action**: Inhalation allows medications to be absorbed directly into the bloodstream through the lungs, resulting in rapid onset of action.
2. **Targeted Delivery**: Inhalation delivers medications directly to the respiratory system, providing targeted therapy for conditions such as asthma, COPD, and respiratory infections.
3. **Lower Systemic Side Effects**: By delivering medications directly to the lungs, the inhalation route can minimize systemic side effects compared to oral or injection routes.
4. **Reduced Dosage Requirement**: Inhalation typically requires lower doses of medication compared to oral or injection routes, as drugs are delivered directly to the site of action.
5. **Patient Preference**: Many patients prefer inhalation therapy over other routes due to its ease of use and the perception of immediate relief for respiratory symptoms.

Disadvantages

1. **Technique Dependency**: Proper inhalation technique is essential for effective drug delivery, and some patients may struggle with using inhalation devices correctly.
2. **Device Complexity**: Inhalation devices can be complex to use, requiring proper assembly, maintenance, and coordination between inhalation and medication release.
3. **Limited Application**: Inhalation therapy is primarily suitable for respiratory conditions and may not be suitable for medications targeting other areas of the body.
4. **Irritation**: Some medications delivered via inhalation may cause irritation to the respiratory tract, leading to coughing, throat irritation, or bronchospasm in sensitive individuals.
5. **Cost**: Inhalation devices and medications can be more expensive compared to oral medications, potentially limiting access for some patients.

5. Rectal Route

Drugs are inserted into the rectum for absorption into the bloodstream. This route is used when oral administration is not feasible, such as in patients who are vomiting or unconscious. It can also provide local effects for conditions like hemorrhoids or nausea.

Advantages

1. **Avoids First-Pass Metabolism**: Drugs administered rectally bypass the liver and enter the systemic circulation directly via the rectal veins, avoiding first-pass metabolism and potentially enhancing bioavailability.
2. **Rapid Absorption**: The rectal mucosa has a rich blood supply, allowing for relatively rapid absorption of medications into the bloodstream.
3. **Useful in Nausea/Vomiting**: The rectal route can be used when oral administration is not feasible due to nausea, vomiting, or impaired consciousness, ensuring medication delivery in such cases.
4. **Localized Therapy**: Rectal medications can provide localized therapy for conditions such as hemorrhoids, anal fissures, or inflammatory bowel disease.
5. **Pediatric and Geriatric Use**: The rectal route is often preferred in pediatric and geriatric populations, as it can be easier and more acceptable than oral or injection routes for some patients.

Disadvantages

1. **Lack of Patient Acceptance**: Rectal administration may be perceived as uncomfortable or invasive by some patients, leading to reluctance or non-compliance with treatment.
2. **Variable Absorption**: Absorption of rectally administered drugs can be variable and unpredictable due to factors such as rectal pH, fecal matter, and rectal mucosal integrity.
3. **Risk of Irritation**: Some medications or excipients used in rectal formulations may irritate the rectal mucosa, leading to discomfort, bleeding, or local irritation.
4. **Limited Drug Selection**: Not all medications are available in rectal formulations, limiting the options for rectal administration.
5. **Inconvenience**: Rectal administration may be considered inconvenient compared to other routes, requiring proper positioning and insertion of suppositories or enemas.

6. Sublingual/Buccal Route

Medications are placed under the tongue (sublingual) or between the cheek and gum (buccal). This route allows for rapid absorption into the bloodstream without passing through the digestive system or first-pass metabolism in the liver. It's commonly used for drugs like nitroglycerin and some opioids.

Advantages

1. **Rapid Absorption**: Drugs administered via the sublingual or buccal route are absorbed directly into the bloodstream through the mucous membranes, leading to rapid onset of action.
2. **Bypasses First-Pass Metabolism**: Sublingual and buccal medications bypass the liver and gastrointestinal tract, avoiding first-pass metabolism and potentially enhancing bioavailability.
3. **Convenient Administration**: Sublingual and buccal medications are easy to administer and do not require swallowing, making them suitable for patients with difficulty swallowing or nausea.
4. **Patient Compliance**: Many patients prefer sublingual and buccal medications due to their ease of use, convenience, and avoidance of needles or swallowing pills.
5. **Precise Dosing**: Sublingual and buccal formulations allow for precise dosing, as medications are directly absorbed into the bloodstream without the need for gastrointestinal absorption.

Disadvantages

1. **Limited Drug Compatibility**: Not all drugs are suitable for sublingual or buccal administration, as they may require specific formulations or characteristics to be effectively absorbed through the mucous membranes.
2. **Taste and Sensation**: Some medications administered sublingually or buccally may have an unpleasant taste or cause irritation or discomfort in the mouth, leading to patient dissatisfaction or non-compliance.
3. **Saliva Interference**: Saliva production and composition can affect drug absorption via the sublingual and buccal routes, potentially altering drug effectiveness or bioavailability.
4. **Limited Drug Stability**: Sublingual and buccal formulations may have limited stability, requiring careful storage and handling to maintain drug efficacy and integrity.
5. **Inconvenience for Prolonged Use**: Sublingual and buccal administration may be inconvenient for medications that require frequent or prolonged dosing, as repeated administration may lead to mucosal irritation or discomfort.

7. Transdermal Route

Medications are delivered through the skin via patches or creams. The drug is absorbed into the bloodstream through the skin for systemic effects. This route provides continuous, controlled release over an extended period.

Advantages

1. **Controlled and Sustained Release**: Transdermal patches deliver medication through the skin in

a controlled and sustained manner, providing continuous drug release over an extended period (usually hours to days).

2. **Avoids First-Pass Metabolism**: Transdermal delivery bypasses the liver and gastrointestinal tract, avoiding first-pass metabolism and potentially enhancing drug bioavailability.
3. **Reduced Systemic Side Effects**: Transdermal administration can minimize systemic side effects by delivering medication directly into the bloodstream while avoiding the digestive system.
4. **Convenient and Non-Invasive**: Transdermal patches are easy to apply and remove, offering a non-invasive and convenient option for medication administration.
5. **Improved Patient Compliance**: Transdermal patches provide a simple and user-friendly method of medication delivery, potentially improving patient compliance compared to oral medications or injections.

Disadvantages

1. **Limited Drug Absorption**: Not all drugs are suitable for transdermal delivery, as their molecular size, lipophilicity, and other factors can affect skin permeability and absorption.
2. **Skin Irritation**: Some individuals may experience skin irritation, allergic reactions, or sensitization at the application site, leading to discomfort or adverse effects.
3. **Slow Onset of Action**: Transdermal patches may have a slower onset of action compared to other routes of drug administration, as the medication must first penetrate the skin barrier before entering the bloodstream.
4. **Size and Thickness Constraints**: Transdermal patches are restricted by the size and thickness of molecules that can be effectively delivered through the skin, limiting the range of drugs suitable for this route.
5. **Potential for Adhesion Issues**: Transdermal patches may not adhere well to all skin types or may become displaced during activities such as bathing or exercise, affecting drug delivery and efficacy.

8. Intranasal Route

Medications are administered through the nose for rapid absorption into the bloodstream. It's used for drugs like nasal sprays or drops for conditions like allergies, congestion, or migraines.

Advantages

1. **Rapid Absorption**: Intranasal medications are absorbed directly through the nasal mucosa into the bloodstream, resulting in rapid onset of action.
2. **Non-Invasive**: Intranasal administration does not require needles or invasive procedures, making it well-tolerated and suitable for patients who may be averse to injections.
3. **Convenient Administration**: Intranasal medications are easy to administer and do not require swallowing, making them suitable for patients with difficulty swallowing or nausea.
4. **Avoids First-Pass Metabolism**: Intranasal drugs bypass the liver and gastrointestinal tract, avoiding first-pass metabolism and potentially enhancing bioavailability.
5. **Targeted Delivery to the Brain**: Intranasal administration can provide targeted delivery of drugs to the central nervous system, bypassing the blood-brain barrier and achieving therapeutic concentrations in the brain.

Disadvantages

1. **Nasal Irritation**: Some individuals may experience nasal irritation, dryness, or discomfort with intranasal medications, leading to nasal congestion or nosebleeds.
2. **Variable Absorption**: Absorption of intranasal medications can be variable and affected by factors such as nasal mucosal integrity, mucociliary clearance, and individual differences in nasal anatomy.
3. **Limited Volume Capacity**: The nasal cavity has limited volume capacity, restricting the amount of medication that can be administered intranasally in a single dose.
4. **Nasal Administration Devices**: Intranasal medications require specialized administration devices such as nasal sprays, droppers, or atomizers, which may be unfamiliar or challenging for some patients to use correctly.
5. **Potential for Nasal Deposition**: Some intranasal medications may deposit in the anterior or posterior nasal passages, leading to reduced drug absorption or systemic side effects.

Each route of administration has its advantages, disadvantages, and specific considerations based on factors such as drug properties, patient characteristics, and desired therapeutic outcomes.

Research Updates

- In the article titled "Recent Trends in Traditional Medicine Dosage Forms and Present Status of Unani and Ayurvedic Medicine" by Hamiduddin, a lecturer in the Department of Ilmul Saidla at the National Institute of Unani Medicine, Bangalore, Karnataka, India, published in the International Journal of Pharmaceutical Sciences and Research, various innovations that can be adopted in Ayurvedic medicine are discussed. These innovations include the development of granules, tablets, capsules, suspensions, syrups, linctus, emulsions, liposomes, hair dyes, toothpaste, face packs, dentifrices, hand wash, gel, sprays, shampoo, eye drops, suppositories, ointments, liniments, and face powder.
- In the study titled "Modification of Drug Dosage Form of Arjuna Ksheerapaka by Using Spray Drying Technology" by Swapnil Talmale, published in the Journal of Research in Traditional Medicine in 2017, Arjuna Ksheerapaka was prepared following guidelines from Acharya Yadavaji Trikamji's contemporary reference textbook. The preparation involved using a Labultima spray dryer unit set at standard thermoregulatory settings to create a spray-dried powder. This method aims to modernize traditional Ayurvedic formulations by enhancing their stability, shelf life, and ease of use while preserving their therapeutic properties.
- In the study titled "Comparative GC-MS Analysis of Gomutra Sadhita Triphala Kvatha and Gomutra Sadhita Triphala Arka" by Neerja Thakur, a PG Scholar in the Department of Rasa Shastra and Bhaishajya Kalpana at Parul Institute of Ayurved, Parul University, Vadodara, Gujarat, published in the Journal of Survey in Fisheries Sciences, it is revealed that Gomutra Sadhita Triphala Kvatha and Gomutra Sadhita Triphala Arka dosage forms contain entirely different components. Arka is rich in volatile compounds with anti-inflammatory properties, whereas Kvatha contains components that inhibit protein denaturation, thereby also acting as an anti-inflammatory agent.
- A review by Virali J Parmar from Sardar Patel College of Pharmacy, Bakrol Anand, Gujarat, India, published in the Journal of Pharmacognosy and Phytochemistry, focuses on the preparation and evaluation of a herbal nasal spray. The study aims to evaluate Tulsi distillate prepared through various methods for use in a nasal spray. The intranasal delivery system utilizes Tulsi distillate in an aqueous solution. The formulation includes Tulsi distillate, saline, sodium benzoate, eucalyptus oil, glycerine, and purified water. Distilling 250 g of Tulsi produced approximately 0.2 ml of slightly water-soluble and viscous distillate. The study assessed various parameters, including sterility, visual appearance, and stability.
- In "Formulation and Evaluation of Herbal Transdermal Patches," Jyothsna Savula from the Department of Pharmacognosy at Marri Laxman Reddy Institute of Pharmacy, Dundigal, Hyderabad, Telangana, India, prepared various matrix-type patches with different polymer combinations using Nelumbo nucifera flowers. Phytochemical tests showed the presence of alkaloids, glycosides, and amino acids in the methanolic extracts. The herbal transdermal patches exhibited good folding endurance, moisture uptake, and drug content uniformity. Over 24 hours, formulation F6, with a higher HPMC to PVA ratio, demonstrated the best drug release and permeation.

Multiple Choice Questions

1. **What does the Greek word "kosmetikos," from which the term "cosmetic" is derived, mean?**
   a. To adorn b. To cleanse
   c. To heal d. To beautify
2. **According to the Drugs and Cosmetics Act, 1945, which of the following is NOT considered a cosmetic?**
   a. Lipstick
   b. Deodorant applied to the body
   c. Room deodorant d. Nail polish
3. **Which of the following is excluded from the definition of a cosmetic?**
   a. Hair shampoo b. Soap
   c. Face powder d. Nail polish remover
4. **Which of the following is NOT a function of cosmetics?**
   a. Maintain body health and hygiene
   b. Provide a sense of well-being
   c. Cure diseases
   d. Avoid premature aging of the skin
5. **What type of water is recommended for use in cosmetic preparations?**
   a. Tap water b. Mineral water
   c. Distilled or purified water d. Spring water
6. **How are cosmetics classified according to their function?**
   a. Skin care, nail care, oral care
   b. Curative, protective, corrective, decorative
   c. Aerosols, cakes, emulsions
   d. Cleansing, beautifying, altering appearance
7. **Which regulatory framework governs cosmetics in India?**
   a. Federal Food, Drug, and Cosmetic Act (FDCA)
   b. Regulation (EC) No 1223/2009
   c. Drugs and Cosmetics Act, 1940
   d. Pharmaceutical and Medical Device Act (PMDA)
8. **What is the primary purpose of Good Manufacturing Practices (GMP) in cosmetics?**
   a. To ensure proper marketing and labeling
   b. To standardize nomenclature for ingredients
   c. To maintain consistent production quality and safety
   d. To prohibit animal testing
9. **Which of the following regions has banned animal testing for cosmetics?**
   a. United States b. China
   c. European Union d. Japan
10. **What emerging trend focuses on regulating claims related to "natural" or "organic" cosmetics?**
    a. Nano-materials b. Sustainability
    c. Clean beauty d. Digital oversight
11. **What is the primary purpose of a Quality Control (QC) laboratory in a cosmetic manufacturing plant?**
    a. Packaging and labeling products
    b. Conducting in-process and finished product testing
    c. Heating and emulsifying raw materials
    d. Managing waste disposal
12. **What type of material flow is ideal in a cosmetic manufacturing plant?**
    a. Circular flow to minimize space
    b. Zigzag flow to utilize all areas
    c. Linear flow to minimize cross-contamination
    d. Random flow to increase flexibility
13. **Which of the following equipment is commonly used for emulsification in cosmetics?**
    a. Centrifuge
    b. High-speed emulsifier
    c. Roll mill d. Bead mill
14. **What is the primary function of preservatives in cosmetic formulations?**
    a. To add color to the product
    b. To blend oil and water phases
    c. To prevent microbial growth
    d. To enhance product fragrance
15. **What is the role of HVAC systems in a cosmetic manufacturing facility?**
    a. Provide lighting for the production floor
    b. Maintain controlled temperature and humidity
    c. Clean surfaces and equipment
    d. Dispose of waste materials
16. **Which of the following raw materials serves as a base in most cosmetic products?**
    a. Glycerin b. Water
    c. Cetyl Alcohol d. Titanium Dioxide

17. **What is the objective of the heating and cooling process in cosmetic manufacturing?**
    a. To sterilize the packaging material
    b. To facilitate ingredient solubility and emulsification
    c. To reduce production time
    d. To mix the ingredients thoroughly
18. **Which standard is specifically related to cosmetics GMP?**
    a. ISO 22716 b. ISO 9001
    c. FDA CFR 21 Part 820 d. GMP 13485
19. **Which of the following is an example of an emollient used in cosmetics?**
    a. Parabens b. Glycerin
    c. Titanium Dioxide d. Phenoxyethanol
20. **What is the primary purpose of labeling in cosmetic products?**
    a. To enhance visual appeal
    b. To protect the product from contamination
    c. To provide regulatory information like ingredients and usage instructions
    d. To increase product shelf life
21. **What is the primary role of preservatives in cosmetics?**
    a. Improve product texture
    b. Prevent microbial contamination
    c. Enhance fragrance
    d. Increase product viscosity
22. **Which microorganism is most commonly found in contaminated cosmetics?**
    a. Escherichia coli
    b. Staphylococcus aureus
    c. Pseudomonas aeruginosa
    d. Candida albicans
23. **Which safety category does the SCCS assign to products for children under three years?**
    a. Category 1 b. Category 2
    c. Category 3 d. Category A
24. **What does Good Manufacturing Practice (GMP) primarily focus on?**
    a. Reducing costs
    b. Ensuring product quality and safety
    c. Improving fragrance stability
    d. Increasing shelf life
25. **Which of the following is a common fungal contaminant in cosmetics?**
    a. Rhodotorula spp.
    b. Enterobacter gergoviae
    c. Streptococcus spp.
    d. Salmonella spp.
26. **Why is preservative efficacy testing (PET) essential in cosmetics?**
    a. To assess pH stability
    b. To ensure long-term microbial stability
    c. To verify fragrance consistency
    d. To check for heavy metals
27. **Which pH value range is typically favorable for bacterial contamination in cosmetics?**
    a. Below 3 b. Between 4 and 9
    c. Above 10 d. Neutral (7) only
28. **What is the primary purpose of stability testing in cosmetics?**
    a. To ensure aesthetic appeal
    b. To maintain functionality and quality over time
    c. To enhance fragrance strength
    d. To reduce packaging costs
29. **Which of the following is a key factor in preventing microbial contamination during manufacturing?**
    a. Use of airtight packaging
    b. Maintaining sterile manufacturing conditions
    c. Adding excess thickeners
    d. Increasing the pH above 10
30. **What type of products are considered "intermediate products"?**
    a. Finished goods ready for sale
    b. Semi-finished components used in production
    c. Products tested for microbial contamination
    d. Raw materials stored in warehouses
31. **Which testing method is most suitable for assessing cosmetic viscosity?**
    a. Pathogen-specific testing
    b. Preservative efficacy testing
    c. Rheological analysis
    d. Colorimetric testing
32. **What is the primary function of emulsifiers in cosmetics?**
    a. Reduce microbial growth
    b. Stabilize oil and water mixtures
    c. Enhance color vibrancy
    d. Improve fragrance longevity
33. **Which regulatory body oversees cosmetic safety in Europe?**
    a. FDA b. SCCS
    c. ISO d. WHO

34. What does the term "batch testing" refer to in cosmetics quality control?
a. Testing a random sample from a production batch
b. Testing all products from a batch individually
c. Testing raw materials before production
d. Simulating user experience with the product

35. What is a key benefit of New Approach Methods (NAMs) in skin sensitization testing?
a. Reduced reliance on animal testing
b. Improved product fragrance
c. Increased use of natural preservatives
d. Extended product shelf life

36. What does RAPEX monitor in Europe?
a. Product recalls due to microbiological risks
b. Consumer satisfaction with cosmetics
c. Packaging material safety
d. Shelf-life predictions for cosmetics

37. Which is a common method for preventing bacterial contamination in raw materials?
a. Storage at high temperatures
b. Heat treatment during production
c. Adding extra fragrance
d. Decreasing viscosity

38. What does "shelf life" testing assess in cosmetics?
a. Long-term microbial stability and product integrity
b. Ease of product application
c. Cost-effectiveness of ingredients
d. Color and fragrance retention only

39. Which population is most vulnerable to infections caused by contaminated cosmetics?
a. Young adults
b. Individuals with compromised immune systems
c. Athletes d. Office workers

40. Which of the following tests evaluates the sensory properties of cosmetics?
a. Analytical testing
b. Panel testing
c. Microbial count testing
d. Pathogen-specific testing immune systems

41. Which of the following is NOT a purpose served by additives in drug formulations?
a. Formulation Shape
b. Stability Enhancement
c. Taste and Odor Masking
d. Increasing the drug's potency

42. What is the primary function of enteric-coated tablets?
a. Enhancing the drug's color
b. Protecting the drug from degradation by gastric juices
c. Increasing the palatability of the drug
d. Expediting the drug's absorption in the stomach

43. Which dosage form is ideal for drugs that are insoluble or unstable in solvents?
a. Capsules b. Suspensions
c. Tablets d. Solutions

44. What is the purpose of sustained-release dosage forms?
a. To release the drug rapidly into the bloodstream
b. To maintain a consistent drug concentration in the bloodstream over an extended period
c. To decrease the shelf life of the drug
d. To mask the unpleasant taste of the drug

45. Which route of administration is associated with dosage forms like rectal or vaginal suppositories?
a. Oral b. Inhalation
c. Topical d. Parenteral

46. Which principle emphasizes understanding a drug's solubility, permeability, and pharmacokinetic behavior to determine the appropriate dosage regimen and release kinetics?
a. Patient-Centered Approach
b. Route of Administration
c. Release Kinetics
d. Biopharmaceutics and Pharmacokinetics

47. What is a primary reason for designing dosage forms to protect medications from microbial contamination?
a. Chemical Stability
b. Environmental Protection
c. Improve Therapeutic Activity
d. Patient Compliance

48. Which dosage form is designed to provide controlled release administration for sustained therapeutic effects?
a. Tablets b. Capsules
c. Injections d. Prolonged-release formulations

49. What is the main objective of designing dosage forms with improved palatability, such as film-coated tablets or flavored suspensions?
a. Environmental Protection
b. Targeted Action
c. Patient Compliance
d. Optimal Drug Action

50. Which principle focuses on selecting the most suitable route of drug administration based on the drug's properties and therapeutic effect desired?
a. Stability and Shelf-Life
b. Excipient Selection and Compatibility
c. Safety and Tolerability
d. Route of Administration

51. Which of the following is NOT a type of solid dosage form?
a. Tablets b. Solutions
c. Capsules d. Powders

52. What type of tablets are placed under the tongue for rapid absorption into the bloodstream?
a. Chewable Tablets b. Effervescent Tablets
c. Sublingual Tablets d. Buccal Tablets

53. Which liquid dosage form consists of finely divided drug particles suspended in a liquid medium?
a. Solutions b. Elixirs
c. Syrups d. Suspensions

54. Which semi-solid dosage form is specifically designed for rectal or vaginal administration and melts at body temperature?
a. Ointments b. Creams
c. Suppositories d. Gels

55. What is the purpose of using troches as a dosage form?
a. To shield medications from environmental factors
b. To provide controlled release administration
c. To facilitate administration and handling
d. To dissolve slowly in the mouth for localized or systemic drug action

56. According to the classification based on their use, which category of cosmetics includes products like creams, powders, lotions, deodorants, and antiperspirants?
a. Nail Care b. Eye Care
c. Skin Care d. Oral Care

57. Which classification of cosmetics includes products with medicinal properties like antiperspirants and certain hair preparations?
a. Curative or Therapeutic b. Protective
c. Corrective d. Decorative

58. Among the physical nature classification of cosmetics, which category includes products such as vanishing cream, cold cream, and cleansing cream?
a. Oils b. Emulsions
c. Pastes d. Powders

59. Which type of cosmetic products are typically included in the aerosols category?
a. Nail polishes b. Face powders
c. Hair perfumes d. Toothpaste

60. What physical nature category of cosmetics includes products like lipsticks and deodorant sticks?
a. Sticks b. Soaps
c. Solutions d. Cakes

61. Which of the following is an advantage of oral tablets and capsules as dosage forms?
a. Rapid onset of action
b. Reduced risk of gastrointestinal irritation
c. Long shelf life
d. Suitable for patients with swallowing challenges

62. What is a disadvantage of topical creams, ointments, and gels?
a. Quick absorption and onset of action
b. Limited to local effects
c. Reduced systemic side effects
d. Convenient and easy to apply

63. Which advantage does the transdermal patch offer as a dosage form?
a. Rapid onset of action
b. Direct delivery to the lungs
c. Avoids first-pass metabolism
d. Suitable for drugs that are poorly absorbed orally

64. What is a disadvantage of parenteral injectables?
a. Limited to drugs that are suitable for inhalation
b. Quick absorption via the respiratory tract
c. Precise control over drug levels in the bloodstream
d. Higher risk of infection

65. Which disadvantage is associated with inhalation dosage forms?
a. Quick absorption via the respiratory tract
b. Reduced systemic side effects
c. Limited to drugs that are suitable for inhalation
d. Bypasses first-pass metabolism

66. What is an advantage of the oral route of drug administration?
a. Rapid onset of action
b. Avoids first-pass metabolism
c. Targeted delivery to the lungs
d. Suitable for patients with swallowing difficulties

67. Which route of drug administration provides controlled and sustained release over an extended period?
a. Topical route b. Inhalation route
c. Rectal route d. Transdermal route

68. What is a disadvantage of the intranasal route of drug administration?
a. Rapid absorption
b. Non-invasive administration
c. Nasal irritation
d. Avoids first-pass metabolism

69. Which advantage does the transdermal route offer over oral administration?
a. Variable absorption
b. Slow onset of action
c. Reduced systemic side effects
d. Limited drug selection

70. What is a disadvantage of the injection route of drug administration?
a. Precise dosage
b. Bypassing first-pass metabolism
c. Non-invasive procedure
d. Risk of infection

Answer Sheet

1.	A.	2.	C.	3.	B.	4.	C.	5.	C.	6.	B.	7.	C.	8.	C.
9.	C.	10.	C.	11.	B.	12.	C.	13.	B.	14.	C.	15.	B.	16.	B.
17.	B.	18.	A.	19.	B.	20.	C.	21.	B.	22.	C.	23.	A.	24.	B.
25.	A.	26.	B.	27.	B.	28.	B.	29.	B.	30.	B.	31.	C.	32.	B.
33.	B.	34.	A.	35.	A.	36.	A.	37.	B.	38.	A.	39.	D.	40.	B.
41.	D.	42.	B.	43.	B.	44.	B.	45.	C.	46.	D.	47.	B.	48.	D.
49.	C.	50.	D.	51.	B.	52.	C.	53.	D.	54.	C.	55.	D.	56.	C.
57.	A.	58.	B.	59.	C.	60.	A.	61.	C.	62.	B.	63.	C.	64.	D.
65.	C.	66.	D.	67.	D.	68	C.	69.	C.	70.	D.				

Write Short Question Answer

1. Define cosmetics as per regulatory provisions and list the factory requirements for their manufacture.
2. Describe the plant layout for a cosmetic manufacturing facility.
3. What are the most commonly used raw materials in cosmetic formulations?
4. Explain the process used to control microbial contamination during the manufacture of cosmetics.
5. Write a note on skin sensitization and sensitivity testing for cosmetics.
6. How are in vitro tests for skin irritation performed?
7. Discuss the stability testing of cosmetic products.
8. Outline the quality control measures for raw materials, intermediates, and finished cosmetic products.
9. Define dosage forms and explain the need for their classification.
10. Classify dosage forms with suitable examples.
11. Explain the importance of stability studies in dosage form development.
12. Discuss the unique characteristics of liquid dosage forms and their advantages.
13. Compare and contrast solid and semi-solid dosage forms with examples.

• • •

14 Drug and Cosmetics Act

• Lecture: 2 hours, non-lecture: 4 • • Total Marks- 5 (MCQ- Yes, SAQ- Yes, LAQ- No) •

Introduction

- The Drugs and Cosmetics Act, 1940, enacted by the Parliament of India, governs the import, manufacture, and distribution of drugs within the country.
- Originally known as the Drug Act, it was passed in 1940 based on recommendations from the Chopra Committee (1930). Complementary Drugs Rules were established in 1945.
- Over time, the Act underwent numerous amendments and is now officially recognized as the Drugs and Cosmetics Act, 1940.
- It serves to safeguard the public by banning the production of substandard or counterfeit pharmaceuticals and ensuring that only qualified personnel handle the sale and distribution of medicines.

Regulation of Traditional Medicines under the Act

- The Act and its associated Drugs and Cosmetics Rules, 1945 include comprehensive provisions to oversee the quality, safety, and efficacy of Ayurveda, Siddha, Unani (ASU), and Homoeopathy medicines.

Key Features

1. **Regulatory Framework**: The Act mandates adherence to guidelines for licensing requirements and Good Manufacturing Practices (GMP) for ASU drugs.
2. **Enforcement by Licensing Authorities**: State Governments appoint Licensing Authorities to ensure compliance with legal requirements for ASU drug manufacturing.
3. **Standardization**: Drugs must meet quality standards as specified in the pharmacopoeia.
4. **Advisory Boards**: The Ayurveda, Siddha, Unani Drugs Technical Advisory Board (ASUDTAB) and Ayurveda, Siddha, Unani Drugs Consultative Committee (ASUDCC) provide technical advice to Central and State Governments, ensuring uniform implementation of the Act across India.

Objectives of the Drugs and Cosmetics Act

The Drugs and Cosmetics Act, 1940 was enacted on April 10, 1940, with several primary objectives to ensure the safe and effective use of drugs and cosmetics in the country.

1. **Regulation of Drugs and Cosmetics**
   - Oversees the import, manufacture, distribution, and sale of drugs and cosmetics.
   - Prevents the entry of substandard or spurious drugs into India through strict import regulations.
2. **Quality Assurance in Drug Manufacturing**
   - Prohibits the production of inferior or counterfeit drugs within the country.
   - Enforces stringent controls on the manufacture, sale, and distribution of Ayurvedic, Siddha, Unani, and Homoeopathic drugs.
3. **Ensuring Qualified Handling**
   - Restricts the sale and distribution of drugs to trained and qualified personnel.
4. **Regulation of Cosmetics**
   - Includes provisions to oversee the import, manufacture, sale, and distribution of cosmetics.

5. Regular Inspections

- Empowers Drug Inspectors to conduct routine inspections of licensed premises.

6. Standards and Testing

Ensures the maintenance of drug and cosmetic standards by:

- Sampling products.
- Testing in approved laboratories.

7. Regulation of Biological and Specialized Products

- Introduces specific measures to regulate the preparation, standardization, and storage of biological products and specialized drugs.

8. Labeling and Packaging Guidelines

- Prescribes detailed standards for the labeling and packaging of all products to ensure transparency and safety.

Chapters of the Drugs and Cosmetics Act, 1940

a. Chapter I: Introduction and Key Definitions: - This chapter provides an overview of the Act and explains essential terms and definitions used throughout the document.

b. Chapter II: Regulatory Authorities and Key Institutions

Details the establishment and roles of:

- Drugs Technical Advisory Board (DTAB)
- Drugs Consultative Committee (DCC)
- Central Drugs Laboratory (CDL)

c. Chapter III: Regulation of Drug and Cosmetic Imports

- Covers the laws and guidelines governing the importation of drugs and cosmetics to ensure quality and safety.

d. Chapter IV: Manufacture, Sale, and Distribution

- Establishes provisions for the manufacturing, sale, and distribution of drugs and cosmetics.
- Includes regulations specific to import procedures for such products.

e. Chapter IV-A: Ayurvedic, Siddha, and Unani Medicines

- This chapter outlines specific rules and provisions for the regulation of Ayurvedic, Siddha, and Unani drugs, ensuring their quality, safety, and compliance with traditional practices.

f. Chapter V: Miscellaneous Provisions

- Contains additional regulations, penalties, and miscellaneous provisions necessary for the effective enforcement of the Act.

Major Amendments and Developments

Drugs Rules, 1945: Complementary rules to the act were introduced in 1945 to provide guidelines for implementation.

Inclusion of ASU Drugs, 1964: The act was amended to include Ayurvedic, Siddha, and Unani (ASU) medicines under its jurisdiction by adding

Chapter IV-A.

Significant Amendment of 1982: One of the most notable revisions occurred in 1982, reflecting contemporary needs and practices.

Enforcement of Revised Guidelines, 1983: The amendments came into effect on **1st February 1983**.

Introduction of Good Manufacturing Practices (GMP), 2003: GMP standards for the manufacturing of medicines were enforced starting **7th March 2003**.

Key Definitions

1. Drugs

- Medicines for internal or external use for humans and animals.
- Substances for diagnosis, treatment, prevention, or mitigation of diseases in humans or animals.
- Items intended to affect the structure or function of the body, excluding food.
- Components of drugs, such as empty gelatin capsules.
- Medical devices for diagnosis, treatment, or prevention, as notified by the Central Government.

For ASU Drugs

- Refers to medicines used according to the formulations prescribed in authoritative texts of Ayurveda, Siddha, and Unani systems of medicine listed in the First Schedule.

2. Cosmetics

- Application to the human body for cleaning, beautifying, enhancing attractiveness, or altering appearance.
- Use as a component in cosmetics.

3. Patent or Proprietary Medicines

- Formulations containing ingredients described exclusively in authoritative ASU texts.
- Does not include:
  - Parenteral (injectable) medicines.
  - Formulations directly included in authoritative ASU texts.

4. Standards of Quality

- **For Drugs**: Must meet the standards of identity, purity, and strength outlined in the Indian Pharmacopoeia (as listed in the Second Schedule).
- **For Cosmetics**: Must comply with prescribed standards defined by relevant authorities.

5. Misbranded Drugs (Section 33-E)

A drug is considered **misbranded** if:

- It is altered (e.g., coloured, coated, powdered, or polished) to conceal damage or enhance its appearance.
- Its labeling does not meet prescribed standards.
- The label, container, or accompanying material contains misleading or false claims.

6. Adulterated Drugs (Section 33-EE)

A drug is classified as adulterated under the following conditions:

- Contains any filthy, putrid, or decomposed substances.
- Prepared, packed, or stored in unhygienic conditions, making it prone to contamination or harmful to health.
- Packaged in a container partially or fully made of poisonous or harmful substances that could render the drug unsafe for consumption.
- Colored with a non-approved dye or pigment.
- Includes toxic or harmful substances that make it injurious to health.
- Mixed with other substances that degrade its quality or strength.

7. Spurious Drugs (Section 33-EEA)

A drug is deemed spurious if it:

- Is imported using a name that rightfully belongs to another drug.
- Imitates or substitutes another drug in a way likely to deceive or mislead users.
- Bears the name of a fictitious manufacturer or company on its label or container.
- Is wholly or partially substituted with a different drug.
- Claims to originate from a specific manufacturer but is not their genuine product.

8. Misbranded Cosmetics

A cosmetic is considered misbranded if:

- It contains non-approved coloring agents.
- Its labeling fails to comply with prescribed standards.
- The label or packaging includes any misleading or false claims about the product.

9. Adulterated Cosmetics

A cosmetic is classified as adulterated under the following conditions:

- Contains filthy, putrid, or decomposed ingredients.
- Is prepared, packed, or stored in unsanitary environments, increasing the risk of contamination or harm to users.
- Packaged in containers partially or fully made of poisonous or deleterious materials.
- Includes non-approved colors for coloring purposes.
- Contains harmful or toxic substances that pose health risks.
- Is mixed with substances that lower its quality or efficacy.

10. Spurious Cosmetics

A cosmetic is labeled as spurious if it:

- Is imported under the name of another cosmetic.
- Imitates or substitutes another cosmetic, deceiving users about its identity.
- Carries the name of a non-existent or fictitious manufacturer or company.
- Claims to be a product of a particular manufacturer but is not genuinely produced by them.

New Developments in Drug and Device Legislation

1. Introduction of the Drugs, Medical Devices, and Cosmetics Bill, 2022 : In July 2022, the Ministry of Health and Family Welfare introduced a draft

of the Drugs, Medical Devices, and Cosmetics Bill, 2022. This initiative aims to review, update, and replace the outdated Drugs and Cosmetics Act, 1940 with modernized provisions to reflect advancements in healthcare and technology.

2. **Objective of the Bill**

The primary goals of the bill are:

- To modernize and align regulatory provisions with current advancements in drug and medical device technology.
- To streamline existing rules, ensuring clarity and efficiency in the regulatory process.
- To accommodate changes in healthcare needs and promote innovation in the industry.

3. **Formation of an Expert Committee:** The Ministry established an 8-member committee led by Mr. V.G. Somani, the Drug Controller General of India, to draft the bill. This committee was tasked with framing regulations to address the contemporary requirements of the pharmaceutical and medical device sectors.
4. **Public Consultation:** The draft bill has been made publicly available on the Ministry's official website, inviting feedback and suggestions from stakeholders and the general public. This inclusive approach seeks to ensure that the new legislation effectively addresses the needs of all relevant parties.
5. **Reference to the Draft:** The draft version of the bill is accessible online (reference link provided in the source section), allowing transparent engagement and collaboration between the Ministry and stakeholders.

Good Manufacturing Practices (GMP) of ASU

The Good Manufacturing Practices (GMP) outlined in Schedule T under Rule 157 are designed to ensure the production of high-quality Ayurvedic, Siddha, and Unani (ASU) medicines. These guidelines aim to standardize the manufacturing processes, maintain product quality, and enhance the credibility of ASU drugs in the market. An exemption is provided under the **IMCC Act, 1970** for registered practitioners such as Vaidyas, Siddhas, and Hakeems who prepare and dispense medicines exclusively for their patients without engaging in commercial sale.

Factory Premises Guidelines

Space Allocation

- **Raw Material Handling**: Adequate facilities for receiving, inspecting, and safely storing raw materials.
- **Manufacturing Zones**: Defined areas for seamless execution of the production process.
- **Quality Control Section**: Independent section equipped for testing and ensuring quality standards.
- **Finished Goods Storage**: Secure storage space for products awaiting dispatch.
- **Administrative Offices**: Dedicated space for management and operational staff.
- **Rejected Goods Storage**: Isolated area to manage rejected goods or materials, preventing contamination.

General Requirements

- **Location and Surroundings**
  - The factory location should be selected to minimize risks of contamination, avoiding:
  - Open sewage systems or drains.
  - Proximity to public lavatories.
  - Nearby factories emitting noxious fumes, excessive smoke, or dust.
- **Building Design and Layout**
  - **Hygienic Conditions**: Ensure the premises are rodent-free, insect-free, and devoid of cobwebs.
  - **Compliance Standards**: Structures must adhere to the Factory Act provisions.
- **Functional Design**:
  - Support a logical and organized workflow to prevent mix-ups and cross-contamination.
  - Maintain smooth, crack-free surfaces to enable easy cleaning and disinfection.
  - Equip floors to resist dust and waste accumulation.
  - Provide effective drainage systems, especially in processing areas.
- **Special Zones**:
  - Furnace/Bhatti areas may utilize tin roofs, with adequate ventilation to minimize dust and pest intrusion.

  - Allocate a separate drying area for raw materials, in-process products, and medicines requiring drying before packaging.
- **Fire Safety**: Equip premises with appropriate fire safety measures and emergency exits.

Water Supply Management

- **Purified Water**: Essential for production processes and should meet microbiological safety standards.
- **Potable Water**: Suitable for cleaning and non-production-related tasks.
- **Storage Tanks**: Ensure tanks are made of non-reactive materials to maintain water quality and prevent microbial growth.

Waste Disposal

- Dispose of waste and residues responsibly, adhering to:
- Environmental Pollution Control regulations.
- Bio-Medical Waste (Management and Handling) Rules, 1996.

Warehousing Facilities

- Create well-organized storage zones to categorize materials such as:
- Raw materials (metallic, mineral, animal-sourced, fresh herbs, etc.).
- Packaging materials.
- In-process, finished, quarantined, rejected, or returned goods.
- Equipment spare parts and change items.

Raw Material Storage

- Store raw materials in labeled containers, clearly specifying:
- Material name and source of supply.
- Status: Under Test, Approved, or Rejected.
- Batch/Lot number and date of receipt.
- Categorize storage for materials such as:
- Metallic/mineral origin.
- Fresh and dry herbs.
- Excipients, volatile oils, perfumes, and extracts.

Production Area Design

- Ensure a unidirectional workflow with a logical sequence of operations to:
- Minimize contamination risks.
- Facilitate streamlined production processes.

Finished Goods Storage

- Quarantine Zone: Secure storage for goods under quality control evaluation.
- Approved Stock Area: Dedicated space for finished goods cleared for distribution.

Quality Control Laboratory

- Independent from production areas and equipped with specialized zones for:
- Pharmacognostical, chemical, and microbiological analysis.
- Housing sensitive instruments in designated rooms.

Staff Requirements

- At least one qualified expert in ASU (Ayurveda, Siddha, or Unani).
- Additional support from professionals in pharmacy, pharmacognosy, or chemistry.

Ancillary Facilities

- Rest Areas: Separate zones for staff relaxation, away from manufacturing or storage areas.
- Hygiene Provisions:
- Workers must undergo regular health checks to ensure freedom from contagious diseases.
- Uniforms must be clean and suited to the nature of work, including protective gear for hands, feet, and head.

Medical Services

- Provide adequate first-aid facilities.
- Conduct initial and annual medical examinations of employees, with records maintained for monitoring health and preventing infections.

Batch Records and Documentation

1. **Batch Manufacturing Records:** Maintain detailed records for each batch produced, documenting all steps and materials used in the manufacturing process to ensure traceability and quality.
2. **Standard Operating Procedures (SOPs):** Develop and implement comprehensive SOPs for all processes, including manufacturing, testing, and cleaning, to maintain consistency and compliance with regulations.
3. **Records of Analysis:** Keep thorough records of all analytical tests performed, including raw

material, in-process, and finished product testing, to verify compliance with quality standards.

4. **Batch Packaging Records:** Document the packaging process for each batch, including materials used, quantities, and labeling, ensuring adherence to specifications.
5. **Distribution Records:** Maintain accurate records of product distribution to ensure traceability and facilitate quick action in case of recalls or issues.
6. **Market Complaint Records:** Log and review all complaints related to product quality, documenting investigations and corrective actions taken to address concerns effectively.
7. **Master Formula Records:** Create and maintain a master formula record for each product, outlining the formulation, manufacturing process, and quality control parameters.

Validation Processes

1. Validation and Process Validation

- Conduct validations according to predefined protocols to ensure that processes consistently produce products meeting quality standards.
- Include detailed validation of equipment, manufacturing procedures, and cleaning processes.

Product Recall System

1. Timely and Effective Recalls

- Develop a robust product recall system to swiftly identify and retrieve defective products.
- Ensure communication reaches all suppliers and retailers promptly, minimizing risks to public health.

Complaint Handling and Adverse Reaction Monitoring

1. Complaint Management

- Establish written procedures for handling complaints related to Ayurveda, Siddha, and Unani products.
- Designate responsible personnel to investigate and evaluate each complaint thoroughly.
- Maintain detailed records of investigations, findings, and remedial actions taken.

2. Adverse Reaction Monitoring

- Monitor and record any reported adverse reactions to products, ensuring timely and appropriate action to mitigate risks.

General Good Manufacturing Practices (GMP) for Rasaushadhis

The manufacturing of Rasaushadhis adheres to general GMP principles while incorporating specific guidelines outlined under the Drugs and Cosmetics Rules, 1945. These guidelines were formalized through Gazette Notification (G.S.R. No. 157(E)) on March 4, 2009.

1. Specific Requirements for Rasaushadhi Manufacturing

The guidelines aim to set forth minimum technical and quality assurance requirements for herb-mineral-metallic formulations like Bhasmas and Satwas used in Ayurveda, Siddha, and Unani medicines. Key objectives include:

- Authenticity verification of raw materials (metals and minerals).
- Validation of processes and quality control standards.
- Compliance with safety measures for preparation as per classical texts.
- Restriction of manufacturing rights to units with certified GMP compliance.

Only units inspected by a team of AYUSH and Rasashastra experts are eligible for GMP certification for Rasaushadhis.

2. Manufacturing Process Areas

To prevent cross-contamination, dedicated and isolated sections must be maintained for Rasaushadhi preparations like Bhasmas and Kupipakva Rasayana.

- **Heating (Bhatti) Section**
  - Minimum size: 100 sq. ft.
  - Facilities for heating, burning, and Puta with ventilation, exhausts, and chimneys.
  - Acceptable fuels: Coal, firewood, cow dung cakes, or modern alternatives like oil and gas furnaces.
- **Grinding and Drying Area**
  - Minimum size: 100 sq. ft.
  - Manual or mechanical grinding allowed; drying must be done in sunlight or an oven at specific temperatures.
- **Rasaushadhi Storage**
  - Minimum size: 100 sq. ft., designed per batch size and pharmacopoeial standards.

  - Modern equipment (e.g., pyrometers) must be used for monitoring and maintaining the required temperatures.

3. Quality Control

- **In-Process Quality Control**

Exclusive registers for process tracking are mandatory:

  - **Shodhana Register**: Tracks raw materials, solvents, methods, and durations.
  - **Bhavana and Puta Register**: Records material quantities, duration, Bhavana dravyas, type of Puta, and temperatures.
  - **Grinding Register**: Details equipment type, material quantity, and grinding duration.
  - **Packing Records**: Captures dosage form, weights, and packaging details.

- **Finished Product Quality Control**
  - Testing as per pharmacopoeial standards for parameters like Rekhapurnatwa, Laghutwa, and Niruttha.
  - Physico-chemical characterization with microscopes and analyzers.
  - Disintegration tests for vati or tablets must be documented.

4. Product Recalls

- A robust recall mechanism must ensure timely information dissemination to all stakeholders, including suppliers and retailers.
- Packaging inserts should include manufacturer details and a helpline for reporting adverse reactions.
- Recalled products should be stored securely until disposal.

5. Medical Examination of Employees

- Annual medical check-ups for employees are required to identify potential health impacts from manufacturing materials. Records must be accessible for regulatory inspections.

6. Self-Inspection

- Authorized personnel trained in Rasaushadhi processing and quality assurance must oversee releases. Such individuals must hold a BAMS, Siddha/Unani degree, or B.Pharm in Ayurveda/Siddha/Unani Medicine.

7. Dosage Forms of Rasaushadhis

Rasaushadhis can be processed into ready-to-use dosage forms like:

- Churna, Vati, Gutika, Tablets, and Capsules.
- Labels must disclose the nature of the filler and adhere to pharmacopoeial standards.
- For hospital packs, labels indicating "Hospital Use Only" are required. Individual patient packaging minimizes adverse drug reactions caused by dosage variations.

List of Formulation with Area and Equipment's

Sr. No.	Category of Medicine	Area (Sq. Ft.)	Equipment
1.	Vati/ Gutika/ Tablets	100	Ball Mill, Mass Mixer, Powder mixer, Granulator, Tablet Compressing Machine, Pill Cutting Machine, Polishing Pan, Coating Machine.
2.	Churna/ Powder	200	Disintigretor, Pulveriser, Powder mixer, Sieves, Shifter
3.	Avaleha/ Khanda/ Paka	100	Bhatti, Tray, Big Vessels (Patila), Iron Kadahi, Spatula
4.	Taila/ Ghrita	100	Bhatti, Spatula, Big Vessel, Filtration Machine, Liquid Filing Machine.
5.	Asava/ Arishta	200	Bhatti, Exhaust Fan, Porcelain Jar, big Containers Filtration Machine
6.	Arka	100	Distillation Apparatus, Containers, Liquid Filing Tank
7.	Panaka/ Syrup	150	Bhatti, Big Vessels, Filtration Machine, Containers, Bottle Filling Machine, Capping Machine.
8.	Malahara	100	Bhatti, Gas Stove, Tube Filling machine, End Runner.
9.	Capsules	100	Capsule Filling Machine, Packing Machine, Air Conditioner
10.	Kupipakava/ Bhasma	150	Bhatti, Muffle Furnace, Vessel, Kupi(Bottle), Copper Rod/ Strip, Exhauxt Fan
11.	Pishti/ Anjana	100	Khaval, Ball mill, End Runner, Spatula, Tray
12.	Bhatti Section, Puta	200	—

Sr. No.	Category of Medicine	Area (Sq. Ft.)	Equipment
13.	Washing Area	50	–
14.	Quality Control Section	150	–
15.	Raw Material Storage Room	200	–
16.	Finished Goods Storage Room	150	–
17.	Rejected Goods	50	–
18.	Office	100	–

Food Safety and Standards Authority of India (FSSAI)

Overview

- **Definition:** The Food Safety and Standards Authority of India (FSSAI) is an autonomous statutory organization.
- **Ministry Association:** Operates under the Ministry of Health and Family Welfare, Government of India.
- **Establishment:** Created in 2008 and fully implemented in 2011 to oversee food hygiene and maintain quality standards across India.

Role and Responsibilities of FSSAI

- **Food Safety Oversight:** Responsible for maintaining food safety and setting standards for food products.
- **Legal Framework:** Functions under the Food Safety and Standards Act, 2006.
- **Headquarters:** Central office located in New Delhi.

Composition of FSSAI

- **Leadership:** Led by a Chairman appointed by the Central Government.
- **Member Representation**: Consists of 22 members representing various stakeholders in food safety.
- **Inclusivity:** At least one-third of the members must be women.

Food Safety and Standards Act, 2006

- **Objective:** Streamlines and replaces earlier laws related to food safety and security.
- **Regulatory Scope:** Regulates manufacture, storage, distribution, sale, and import of food products.
- **Previous Acts Replaced:** Includes the Prevention of Food Adulteration Act, 1954, and the Meat Food Product Order, 1973.

Functions of FSSAI

- **Rule Formulation:** Establishes rules and regulations for food manufacturing companies, emphasizing hygiene and safety.
- **Licensing:** Requires food business operators to obtain an FSSAI license or certificate.
- **Quality Assurance:** Ensures compliance with quality and safety standards for food products.

Additional Functions of FSSAI

- **Awareness Campaigns:** Educates citizens about food safety through campaigns and programs.
- **Record Maintenance:** Keeps a comprehensive database of registered organizations.
- **Government Updates:** Alerts authorities about potential food safety threats.

Guidelines for Food Supplement Manufacturers

- **Production Standards:** Ensure high-quality products and prevent contamination during manufacturing.
- **Cleanliness Protocols:** Properly clean equipment and materials before production.
- **Manufacturing Adherence:** Follow defined protocols for consistency and quality.

Labelling Requirements for Food Supplements

- **Simplicity:** Labels must be simple and easy to understand.
- **Truthfulness:** No false or misleading statements allowed on labels.
- **FSSAI Compliance:** Must prominently display the FSSAI logo and license number.

Storage and Sale Guidelines for Food Supplements

- **Labeling:** All products must be labeled with identification tags and lot numbers.
- **Proper Arrangement:** Ensure convenient loading and unloading of materials.

- **Licensing Requirement:** A valid license is necessary for selling or manufacturing food supplements.

FSSAI and Ayurveda

Ensuring Safety and Quality in Ayurveda Aahara

The collaboration between the Ministry of Ayush and the Food Safety and Standards Authority of India (FSSAI) under the Ministry of Health and Family Welfare (MoHFW) has established guidelines to regulate the safety and quality standards of food products under the Ayurveda Aahara category. These regulations aim to promote the integrity of Ayurveda-inspired food and facilitate its growth both nationally and internationally.

Key Aspects of Ayurveda Aahara Regulations

1. Promoting Quality Ayurveda Food Products

- The initiative focuses on ensuring the production of high-quality Ayurveda-based food items.
- It supports the expansion of Make-In-India Ayurveda food products into global markets.

2. Adherence to FSSAI Regulations

- Manufacturing and marketing of Ayurveda Aahara products must comply with the Food Safety and Standards (Ayurveda Aahara) Regulations, 2022.
- Products can only be sold in the market after obtaining the necessary license or approval from FSSAI.

3. Definition of Ayurveda Aahara

- Ayurveda Aahara includes food items prepared using traditional recipes, ingredients, and processes outlined in Ayurveda texts listed in Schedule A of the regulations.
- It encompasses products containing botanical ingredients aligned with the principles of Ayurveda.

Exclusions and Restrictions

1. Non-Inclusion of Medicines and Cosmetics

Ayurveda Aahara does not include:

- Ayurvedic drugs or proprietary medicines.
- Medicinal products, cosmetics, and substances listed in Schedule E of the Drugs and Cosmetics Act, 1940, and its rules.

2. Exclusion of Narcotic Substances

- It excludes narcotic and psychotropic substances or any herbs not specified under Ayurveda Aahara.

3. Not Recommended for Young Children

- Ayurveda Aahara is not recommended for children below the age of 2 years.

Role in Promoting Health

- The regulations cover food recipes and ingredients designed to enhance health and address specific physiological needs.
- Foods identified as Pathya in Ayurveda, consumed during or after diseases and disorders, are included under these regulations.

Conclusion

- **Crucial Role:** FSSAI is essential for ensuring food safety and quality in India.
- **Promoting Awareness:** Encourages adherence to food safety standards in the food industry.
- **Consumer Protection:** Safeguards public health by ensuring the availability of safe and wholesome food.
- The Ayurveda Aahara guidelines represent a comprehensive approach to integrating traditional Ayurvedic principles with modern food safety standards. This initiative by the Ministry of Ayush and FSSAI ensures the authenticity, safety, and global recognition of Ayurveda-inspired food products while maintaining clear distinctions from medicinal and cosmetic Ayurvedic preparations.

FDA Approval Drugs

Overview

The United States Food and Drug Administration (FDA) operates as a federal agency under the Department of Health and Human Services. It is entrusted with the mission of safeguarding and advancing public health by overseeing various products and ensuring their safety, quality, and effectiveness.

Responsibilities of the FDA

1. Public Health Protection

Supervises and regulates the safety of:

- Food and beverages (except meat, poultry, and some egg and catfish products managed by USDA).
- Tobacco products and caffeine products.
- Dietary supplements and cosmetics.
- Over-the-counter and prescription drugs.
- Medical devices and biopharmaceuticals.
- Veterinary products, including animal feed.

2. Oversight of Radiation-Emitting Devices

- Ensures that consumer and medical devices emitting electromagnetic radiation (ERED) do not pose health hazards.

3. Regulation of Biological and Medical Products

Evaluates the safety and effectiveness of:

- Vaccines and gene therapy products.
- Blood transfusions and cellular therapies.
- Household and medical devices.

4. Food and Ingredient Safety

- Inspects and regulates all foods and food additives in interstate commerce, except those managed by USDA.

5. Public Awareness

- Provides science-based health information to educate and inform the public about food, drug, and product safety.

FDA's Drug Approval Process

1. Evaluating Drug Safety and Effectiveness

- The Center for Drug Evaluation and Research (CDER) is responsible for reviewing the data on a drug's benefits and risks.
- A drug receives FDA approval if it demonstrates that its potential benefits outweigh its known risks for the target population.

2. Ensuring Product Standards

- Monitors the quality, safety, and efficacy of human and veterinary drugs, biological products, and medical devices.
- Enforces compliance with safety standards to protect public health.

Conclusion

The FDA plays a critical role in regulating a wide array of products, from food and drugs to cosmetics and radiation-emitting devices. Through its rigorous approval processes and public education initiatives, the FDA ensures the safety and well-being of consumers in the United States.

Multiple Choice Questions

1. What is the main objective of the Drugs and Cosmetics Act, 1940?
a. To promote the export of drugs and cosmetics
b. To regulate the import, manufacture, and distribution of drugs and cosmetics
c. To ban the use of traditional medicines
d. To support unregulated drug manufacturing

2. Which committee's recommendations led to the formation of the Drugs and Cosmetics Act, 1940?
a. V.G. Somani Committee
b. Chopra Committee
c. Hathi Committee
d. A.K. Chatterjee Committee

3. What does Chapter IV-A of the Drugs and Cosmetics Act deal with?
a. Regulation of biological products
b. Regulation of Ayurvedic, Siddha, and Unani medicines
c. Standards for medical devices
d. Misbranded drugs

4. What is considered a "spurious drug" under the Act?
a. A drug with misleading labeling
b. A drug imitating another drug to deceive users
c. A drug containing putrid substances
d. A drug prepared in unsanitary conditions

5. What is the role of the Drugs Technical Advisory Board (DTAB)?
a. To manufacture drugs
b. To enforce penalties
c. To provide technical advice to Central and State Governments
d. To approve cosmetics for export

6. When were Good Manufacturing Practices (GMP) introduced under the Drugs and Cosmetics Act?
a. 1940 b. 1982
c. 2003 d. 2022

7. What is the definition of a "cosmetic" under the Act?
a. A product used exclusively for medical purposes
b. A product applied to enhance attractiveness or alter appearance
c. A product used for diagnosing diseases
d. A drug intended for internal use

8. Which section defines "misbranded drugs" in the Act?
a. Section 33-E b. Section 33-EE
c. Section 33-EEA d. Section 33-B

9. What is the purpose of the Ayurveda, Siddha, Unani Drugs Technical Advisory Board (ASUDTAB)?
a. To draft international trade policies
b. To ensure uniform implementation of the Act for ASU drugs
c. To oversee cosmetic labeling standards
d. To conduct routine inspections

10. What is one of the objectives of the Drugs, Medical Devices, and Cosmetics Bill, 2022?
a. To ban traditional medicines
b. To replace outdated provisions with modernized regulations
c. To prohibit the import of all drugs
d. To eliminate licensing requirements

11. What is the primary objective of Good Manufacturing Practices (GMP) for ASU medicines?
a. To reduce production costs
b. To ensure the production of high-quality medicines
c. To increase commercial sales
d. To replace traditional practices

12. Which act provides exemptions for registered practitioners like Vaidyas, Siddhas, and Hakeems from GMP regulations?
a. Drugs and Cosmetics Act, 1940
b. IMCC Act, 1970
c. Bio-Medical Waste Management Rules, 1996
d. Factory Act, 1948

13. What should the location of the factory avoid to minimize contamination risks?
a. Proximity to markets
b. Open sewage systems or drains
c. Residential areas
d. High-traffic roads

14. Which material is recommended for constructing water storage tanks in GMP facilities?
a. Wood b. Non-reactive materials
c. Iron d. Plastic

15. What is the purpose of the quarantine zone in finished goods storage?
a. For storing defective goods
b. For temporary holding of goods under quality control evaluation
c. For administrative use
d. For returned goods storage

16. Who must be part of the staff in an ASU manufacturing facility as per GMP?
a. An expert in marketing
b. A qualified professional in ASU systems
c. A registered medical practitioner
d. A public relations officer

17. What is the purpose of batch manufacturing records?
a. To track sales
b. To document all steps and materials used in the manufacturing process
c. To record complaints
d. To monitor employee performance

18. Which of the following is NOT included in validation processes under GMP?
a. Equipment validation
b. Cleaning validation
c. Market survey validation
d. Process validation

19. What must be done in case of an adverse reaction to a product?
a. Ignore it unless there are multiple complaints
b. Record the incident and take timely corrective action
c. Increase production of the product
d. Recall all products immediately

20. What is the function of a robust product recall system?
a. To advertise products
b. To identify and retrieve defective products swiftly
c. To monitor competitors
d. To reduce production costs

21. Under which notification were the GMP guidelines for Rasaushadhis formalized?
a. G.S.R. No. 157(F) b. G.S.R. No. 157(E)
c. G.S.R. No. 345(E) d. G.S.R. No. 200(F)

22. What is the minimum size required for the heating (Bhatti) section in Rasaushadhi manufacturing units?
a. 50 sq. ft. b. **100 sq. ft.**
c. 150 sq. ft. d. 200 sq. ft.

23. What is the purpose of a Shodhana Register?
a. To document product recalls
b. To record packaging materials used
c. To track raw materials, solvents, methods, and durations
d. To conduct disintegration tests

24. Which of the following fuels is permitted for use in the Bhatti section?
a. Solar energy only
b. Coal, firewood, cow dung cakes, oil, and gas furnaces
c. Electricity only
d. Biomass exclusively

25. What testing is required for finished Rasaushadhis to ensure quality?
a. Shodhana testing only
b. Rekhapurnatwa, Laghutwa, and Niruttha testing
c. Pyrometer testing exclusively
d. Drying tests

26. What is the minimum size required for the Grinding and Drying area in a Rasaushadhi manufacturing unit?
a. 50 sq. ft. b. 80 sq. ft.
c. 100 sq. ft. d. 200 sq. ft.

27. Who is authorized to oversee the release of Rasaushadhis?
a. Factory supervisors
b. Workers with on-the-job training
c. Personnel with BAMS, Siddha/Unani degree, or B.Pharm in Ayurveda/Siddha/Unani Medicine
d. Any pharmacist

28. What is the primary objective of medical check-ups for employees in Rasaushadhi manufacturing units?
a. To monitor production efficiency
b. To identify potential health impacts from manufacturing materials
c. To ensure adherence to manufacturing deadlines
d. To evaluate product packaging standards

29. What information must be included on labels for Rasaushadhi hospital packs?
a. Weight only
b. Manufacturing date only
c. "Hospital Use Only" and dosage information
d. Storage conditions exclusively

30. What mechanism must be in place to address product recalls?
a. Annual reviews
b. A robust recall mechanism to inform stakeholders and securely store recalled products
c. Immediate disposal of all products
d. Re-testing of recalled products without informing suppliers

31. What is the primary role of the Food Safety and Standards Authority of India (FSSAI)?
a. Promote international trade
b. Ensure food safety and hygiene standards
c. Regulate cosmetic products
d. Approve Ayurvedic medicines

32. Under which ministry does FSSAI operate?
a. Ministry of Agriculture
b. Ministry of Health and Family Welfare
c. Ministry of Commerce and Industry
d. Ministry of Food Processing Industries

33. What act governs the functioning of FSSAI?
a. Drugs and Cosmetics Act, 1940
b. Prevention of Food Adulteration Act, 1954
c. Food Safety and Standards Act, 2006
d. Consumer Protection Act, 1986

34. What is excluded from the Ayurveda Aahara category?
a. Pathya foods
b. Ayurveda drugs or proprietary medicines
c. Foods designed to enhance health
d. Foods prepared using Ayurvedic recipes

35. What symbol must be prominently displayed on food supplements under FSSAI regulations?
a. International Food Safety Logo
b. Green Dot Symbol
c. FSSAI logo and license number
d. Organic Certification Logo

36. What organization is responsible for approving drugs in the United States?
a. WHO b. FDA
c. USDA d. CDC

37. Which center of the FDA evaluates the safety and effectiveness of drugs?
a. Center for Food Safety
b. Center for Drug Evaluation and Research (CDER)
c. Center for Disease Control
d. Center for Radiological Health

38. What type of products are regulated by the FDA?
a. Food and beverages only
b. Cosmetics and dietary supplements only
c. Food, drugs, cosmetics, and medical devices
d. Agricultural products and fertilizers

39. What document provides the legal framework for Ayurveda Aahara regulations?
a. Food Safety and Standards (Ayurveda Aahara) Regulations, 2022
b. Drugs and Cosmetics Act, 1940
c. Prevention of Food Adulteration Act, 1954
d. Consumer Protection Act, 1986

40. What is a prerequisite for manufacturing Ayurveda Aahara products?
a. Approval from the Ministry of AYUSH
b. Obtaining a license or approval from FSSAI
c. Certification from WHO
d. Registration with the Central Food Safety Committee

Answer Sheet

1.	B.	2.	B.	3.	B.	4.	B.	5.	C.	6.	C.	7.	B.	8.	A.
9.	B.	10.	B.	11.	B.	12.	B.	13.	B.	14.	B.	15.	B.	16.	B.
17.	B.	18.	C.	19.	B.	20.	B.	21.	B.	22.	B.	23.	C.	24.	B.
25.	B.	26.	C.	27.	C.	28.	B.	29.	C.	30.	B.	31.	B.	32.	B.
33.	C.	34.	B.	35.	C.	36.	B.	37.	B.	38.	C.	39.	A.	40.	B.

Write Short Question Answer

1. Explain the regulatory provisions under the Drugs and Cosmetics Act, 1940, and Rules, 1945, regarding the import, manufacture, sale, and distribution of Ayurvedic, Siddha, and Unani (ASU) drugs.
2. What are the key differences between misbranded, adulterated, and spurious drugs as defined in the Drugs and Cosmetics Act, 1940?
3. Briefly outline the Good Manufacturing Practices (GMP) requirements for ASU drugs as per Schedule T.
4. What is the role of the Food Safety and Standards Authority of India (FSSAI) in the regulation of Ayurvedic drugs and products?
5. Discuss the importance of FDA approval for Ayurvedic formulations intended for export and the regulatory challenges associated with it.

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